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## THE SURGICAL TREATMENT OF COMPLICATED DUODENAL ULCER

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**A** DUODENAL ulcer which perforates into the peritoneal cavity, produces acute or chronic obstruction, proves intractable to medical treatment, bleeds repeatedly, or persists following a previous operation, presents a surgical condition. This applies also to stomal ulcer. We have found that from 25 to 30 per cent of patients with duodenal ulcer have one or more of these complications.

The operation is directed toward removal of the ulcer, if possible, reduction of the gastric acids and control of gastric hypermotility. The only exception to this rule is the acutely perforating ulcer. Since chemical, hormonal, psychic and neural elements are believed to have some influence upon the course of the disease, these are also taken into consideration in the therapeutic approach. So varied are the problems involved that the treatment of each patient becomes an individual matter. This is especially true of the operative treatment, since its success depends not only upon conformity to the surgical criteria, but also upon the choice of the procedure with proper consideration for the laboratory and pathologic findings, as well as upon the experience and skill of the surgeon. When feasible, medical treatment is recommended for a time prior to operation, in order to ameliorate any inflammatory reaction about the ulcer and thus to facilitate the technical performance and add to the safety of the procedure.

*Acute Perforation.* Ulcers which perforate into the abdominal cavity are usually situated on the anterior wall of the duodenum.

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The perforation may be either acute, unprotected, or chronic, protected. We have found that approximately 13 per cent of all surgical ulcers are of the acute, unprotected type, many of them perforating without previous warning of the disease.

An acute perforation is a surgical emergency. Operation within a few hours after the perforation takes place is imperative in order to stop the leakage of the intestinal contents into the peritoneal cavity. Simple closure of the opening is the wisest course. Despite the fact that a subsequent operation may be required, one's immediate concern is to save the patient's life.

In making the closure, no suture is placed around the perforation. The tissues are often so friable that a purse string may cut through, leading to leakage, or it may produce further inflammation and edema and consequent obstruction. It is our practice to insert four or five mattress sutures of fine catgut in the anterior surface of the stomach and attach it to the duodenum, thus covering the ulcer. A segment of omental fat is then tied over the suture line as a further protection. Neither leakage nor obstruction at the pylorus has been observed in our cases following the use of this method.

A large number of perforating ulcers are quite small, leakage is slight and the opening is soon protected by fat, omentum, the gall-bladder, the under surface of the liver or some other adjacent structure. In this type, the symptoms soon subside and the patient often recovers without operation. To dispense with surgery in such cases, however, invites the development of a subphrenic abscess or some other complication. Again, the patient with a protected perforation may have persistent symptoms of obstruction incident to edema or deformity of the duodenum at the ulcer site. In this event, surgery becomes necessary to overcome the obstruction.

*Obstruction.* Chronic obstruction of the duodenum, particularly in an individual of middle age or beyond with a long history of ulcer, is usually attributable to a cicatrization incident to healing of the lesion. In younger patients, the obstruction is likely to be of an inflammatory nature associated with an active lesion on either the anterior or posterior wall, or both. Or, a cicatrizing and a superimposed inflammatory ulcer may combine to produce the obstruction. In any case, when an anterior ulcer is found, a posterior one may be overlooked unless the pylorus is opened and a careful search is made.

Since cicatrizing ulcers are generally associated with low gastric acids, gastroenterostomy is most effective in the treatment of patients with this type. Practically without exception, relief is imme-

diate and permanent. In fact, few surgical procedures offer such gratifying results, especially in patients in the older age groups.

Pyloric obstruction from edema incident to an active ulcer presents a different problem. The majority of individuals with this complication have high gastric acids. Under such circumstances, a resection is the procedure of choice. When the risk seems too great for resection, a gastroenterostomy with vagotomy may be performed. Our results from the latter procedures have thus far been excellent.

*Intractability.* An intractable duodenal ulcer is regarded as one which gives rise to constant or frequently recurring and more or less severe pain, despite every effort to effect a cure by medical means. Since the majority are multiple, some degree of obstruction, hemorrhage or both is often associated. As a rule, the gastric acids are high. To add to the difficulty of medical management, patients with such an ulcer are prone to be of an extremely nervous and unstable temperament. While one may hesitate to recommend surgery under these circumstances, the patient usually welcomes the prospect of surgical relief.

In view of all the factors concerned, a subtotal gastrectomy with removal of two-thirds of the stomach is our preference of the operations for patients with intractable ulcer. If the acids are extremely high, the resection may well be supplemented by vagotomy as a further precaution against a stomal ulcer.

In undertaking resection for an active duodenal ulcer, the lesion is at times found well down on the second portion of the duodenum. With care, one can usually free the duodenum for three-fourths to 1 inch, which is sufficient to permit a leak-tight closure. If, however, the ulcer is so situated that resection would seriously endanger the duct, a gastroenterostomy with vagotomy may be employed. With this procedure, one runs practically no risk of damaging any of the vital organs.

*Hemorrhage.* More than one-fourth of all patients with duodenal ulcer experience some degree of bleeding, incident to penetration of a posterior lesion into an artery in the head of the pancreas. More than one-half of those who come to surgery have had one or more episodes of bleeding. In a considerable number it is practically constant or recurs often and is fairly profuse. In this type, surgery is indicated, not only because of the disability from the persistent bleeding, but also because of the danger of sudden massive hemorrhage.

In the presence of active bleeding, an ample amount of blood is given to support the patient through the operation. Formerly, it

was believed that repeated small transfusions, given slowly, would protect the patient against a rapid rise of blood pressure and re-opening of the vessel by washing out the clot. There is now much evidence to show that large and repeated transfusions, by quickly replacing the lost blood, may be lifesaving.

For the patient with massive hemorrhage, it is our custom to institute transfusion immediately, together with other supportive treatment. The majority of patients will respond to these measures within a few hours. Especially is this true of those under 45 years of age, whose arteries are elastic; a clot will usually form and close the opening. In this event, the treatment is continued until the blood loss has been replaced, as indicated by restoration of the normal blood pressure and respiration, and subsidence of other signs of shock. If, on the other hand, there is no evidence of improvement within a few hours, surgery is indicated without further delay. Or, if a second episode of massive bleeding occurs after the transfusion is discontinued, the treatment is again instituted and the patient is prepared for immediate operation. Under continuous transfusion, the operation may be safely consummated, even in older patients, provided some serious concurrent disease does not complicate the already grave condition. Here, again, the administration of large quantities of whole blood is a most effective safeguard against a fatal termination.

The accepted surgical procedure for hemorrhagic duodenal ulcer is gastric resection. It is our practice to divide the duodenum below the ulcer, grasp the distal stump with Allis forceps and free the head of the pancreas from the duodenum. The bleeding point is then ligated with little difficulty. Thereafter, the duodenal stump is closed and the resection completed.

*Gastrojejunal Ulcer and Gastrojejunocolic Fistula.* Surgical experience has shown that the best treatment of gastrojejunal ulcer is prevention, by the exercise of care in the choice of operation for duodenal ulcer. Once such an ulcer develops, the proper treatment is surgery. When the situation permits, a short period of medical therapy is desirable prior to operation in order to reduce the inflammatory reaction in the ulcer zone.

The best surgical procedure for gastrojejunal ulcer is disconnection of the anastomosis, removal of the ulcer-bearing area of the jejunum and a high resection of the stomach. Vagotomy may afford an added protection against further difficulty.

Gastrojejunocolic fistula, fortunately rather uncommon, is indeed a serious matter. The fistula is easily recognized clinically, and its presence can be verified by a barium enema when the colon contents



are seen filling the stomach. Correction of nutritional deficiencies preoperatively materially influences the immediate outcome. The use of every possible measure to insure sterilization of the colon and prevent peritonitis will also aid in reducing the high mortality in these cases.

Several methods of operation have been employed for gastrojejunocolic fistula. One may disconnect the transverse colon and close the opening, dismantle the gastroenterostomy, remove the ulcerated portion of the jejunum, then perform a subtotal gastrectomy. This is the most desirable procedure, when feasible, and with current methods of preventing infection is relatively safe. If the inflammatory reaction is severe and the patient is in poor condition, a loop colostomy may be established in the ascending segment to put the fistulous area at rest and permit the inflammation and edema to subside preliminary to resection. Pfeiffer reported a case wherein he made a loop colostomy proximal to the fistula with the idea of subsequent resection; the patient was so well pleased with his improvement, however, that he did not return for the resection. Marshall has recommended another method for the poor risk patient. The terminal ileum is divided and the proximal portion anastomosed to the colon distal to the fistulous opening. Later, a right colectomy and subtotal gastrectomy are performed. This is a formidable procedure, but if the patient survives the end result should be satisfactory.

In a recently reviewed series of 34 patients with gastrojejunal ulcer, 3, or 9 per cent had a fistula. These 34 represent 6.2 per cent of 538 patients who had gastroenterostomy or gastric resection. The respective incidence of gastrojejunal ulcer following the two operations is shown in the table below.

INCIDENCE OF GASTROJEJUNAL ULCER FOLLOWING 538 OPERATIONS

<i>Previous Operation</i>	<i>Number</i>	<i>G. J. U.</i>
Gastroenterostomy	352	29 (8.2%)
Gastric resection	186	5 (2.7%)
Total	538	34 (6.2%)

## SUMMARY

Duodenal ulcer becomes a surgical problem in the presence of acute or chronic obstruction, intractable pain, recurrent bleeding, massive hemorrhage, or a persistent or recurrent ulcer following a previous operation.

The surgical procedure should be one which will remove the ulcer,

if possible, and reduce the gastric hyperacidity and hypermotility. The exceptions to this rule are the acutely perforating ulcer, which is best treated by simple closure, and the cicatrizing obstructing ulcer, for which a gastroenterostomy is most suitable. For the majority of complicated ulcers, a subtotal gastrectomy is the method of choice. If the stomach acids are excessive, a supplementary vagotomy may be advisable. If a gastric resection is not feasible, a gastroenterostomy with vagotomy may be performed. Vagotomy has a definite though limited place in the treatment of duodenal ulcer.

The usual treatment of gastrojejunal ulcer consists of disconnection of the anastomosis, excision of the ulcer-bearing zone of the jejunum and a high gastric resection. Here, also, vagotomy may be worth while. For a gastrojejunocolic fistula, repair of the opening in the transverse colon followed by a high gastric resection is preferable, provided the condition of the patient permits; otherwise, a two stage right colectomy may be employed, according to the method recommended by either Pfeiffer or Marshall, the gastric resection being performed in conjunction with removal of the right colon at the second stage.

## DYNAMIC FACTORS IN MEDULLARY PINNING OF FRACTURES

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**T**HE principle of medullary pin fixation differs basically from that of marrow nailing. Nailing suggests the utilization of bulk, in which a rod is impacted within the marrow cavity like a ramrod in a gun barrel. Thus, mass is used to fix the bone directly, while passively resisting the muscle force of the extremity.

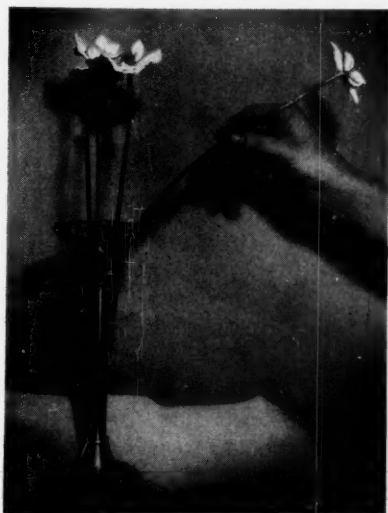


Fig. 1. *Vase of Flowers Principle*. Flowers which are entered into a vase obliquely with flexed stems tend to aright themselves within the vase due to the resiliency of the stems, which exert point pressure within the base. A resilient rod introduced obliquely into the tubular cavity of a bone tends to react in the same manner. This principle has a very broad application in medullary pinning.

Medullary pinning, on the other hand, depends not upon bulk but upon its own dynamic forces and the utilization of the muscular forces of the extremity. It might be likened to the principle of jujitsu, in which one utilizes to his own advantage the superior weight and strength of his opponent.

To limit medullary fixation to the narrow principle of the ramrod

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From the Department of Surgery, Rush Memorial Hospital, Meridian, Miss. Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., Apr. 11-14, 1951.

in the gun barrel is wasteful of dynamic forces. It is a rare fracture that is not acted upon in some way by the intrinsic dynamic forces of an extremity. These forces can react to defeat the surgeon, or, as in jujitsu, can be utilized to his advantage.

Medullary fixation can be directed to passively resist the intrinsic dynamic forces of an extremity, or it can exert continuous dynamic forces of its own. To point out these dynamic forces is the purpose of this paper.

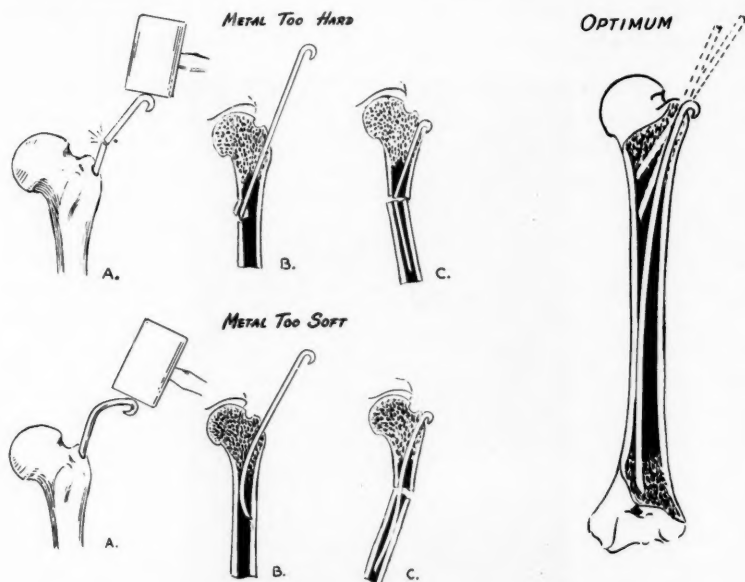


Fig. 2. *Quality of Metal.* For dynamic fixation, pin must possess qualities of strength, limited resiliency, and limited malleability. Optimum Temper: Pin must be malleable enough to bend sufficiently for introduction obliquely into marrow cavity, yet resilient enough to realign itself within the bone. It must have springlike resiliency, yet be amenable to preshaping with bending iron. Metal Too Hard: Pin might break on driving, fracture the bone or penetrate cortex, or fracture within the bone itself. Metal Too Soft: Might bend on driving, might bend within the bone to prevent driving, and lack sufficient strength for secure fixation within the bone.

#### SUMMARY AND CONCLUSIONS

1. The vase of flowers principle (point pressure within the bone) can often be utilized for secure medullary fixation without the need of impacting the marrow cavity with large masses of metal.
2. For dynamic fixation, pins must possess the qualities of strength, limited malleability, and limited resiliency.

3. Dynamic forces can be exerted by a straight pin within a curved bone or by a curved pin within a straight bone.

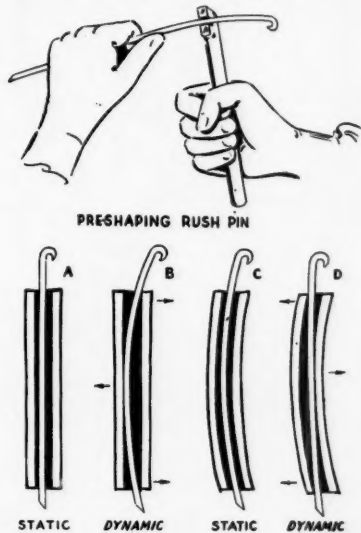


Fig. 3. *Influence of Preshaping Pin and Bone Contour on Dynamics.* (A and C) Pin preshaped to contour of bone exerts no dynamic force. (B) A curved pin in straight bone exerts pressure at three points. (D) A straight pin in a curved bone exerts pressure at three points.

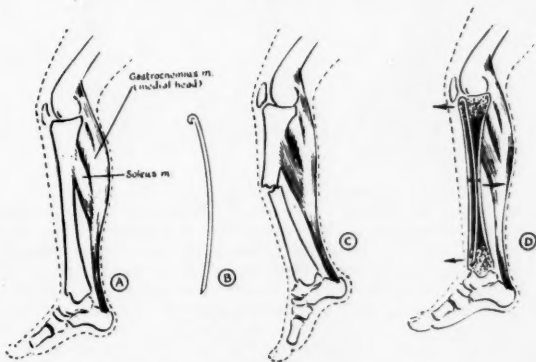


Fig. 4. *Dynamic Forces in Tibia Pinning.* Gastrocnemius and soleus muscles act as bow string tending to angulate the tibial shaft anteriorly. Curved pin resists these forces at three points to limit angulation and tends to control torque.

4. Bone fragments in many regions tend to angulate during the healing period because of continuous dynamic forces exerted by the muscles of the extremity.

5. The dynamic forces can be resisted to the surgeon's advantage by the intelligent application of straight or curved pins.

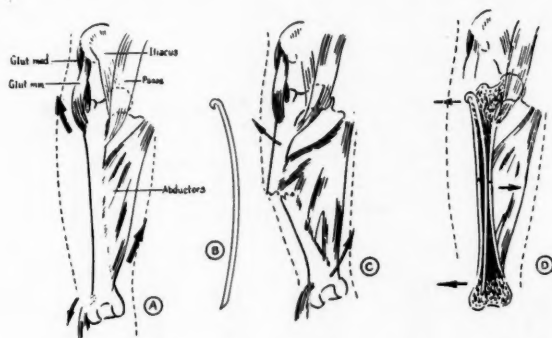


Fig. 5. *Dynamic Forces in Femur Shaft Pinning.* The direction of muscle pull causes the bone to tend toward anterolateral bowing. A curved pin resists these forces at three points to resist angulation and tends to limit torque.

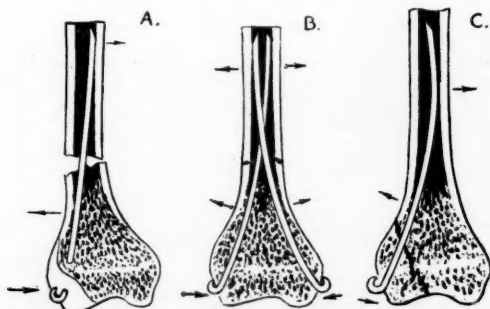


Fig. 6. *Vase of Flowers Principle Applied to Lower Femur.* (A) A single pin driven upward from the condyle exerts three point pressure resulting in angulation and insecure fixation. (B) A second pin to oppose the first gives three opposing points of pressure resulting in secure fixation. (C) Vertical fracture of femoral condyle can be securely fixed by the three point pressure of a single pin. In this instance a continuous compression of the fracture surface is accomplished, which is conducive to rapid healing.

6. Improper use of dynamic pin forces can produce angulation and deformity. Intelligent use of pin forces can correct existing deformities and produce compression of the fractured surfaces.

7. Improper use of pins can cause distraction and non-union. Intelligent use of pins can result in secure fixation with compression and stimulate osteogenesis.



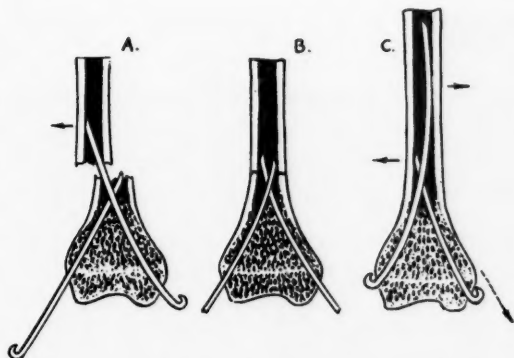


Fig. 7. *Driving Double Pins.* (A and B) Double pins must be driven simultaneously to prevent displacing shaft by pressure of a single point. When both pins are driven simultaneously the shaft does not displace. (C) Effect of length on migration. The long pin exerts pressure by its shaft against the cortex and does not tend to migrate. The short pin is exerting pressure by its point against the cortex and will tend to migrate backwards by this continuous pressure.

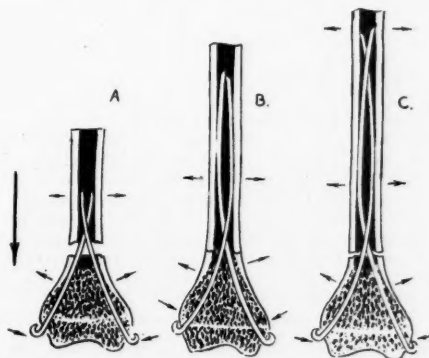


Fig. 8. *Influence of the Length of Pins on the Dynamic Forces Exerted Upon the Bone by the Pins.* (Dynamic forces indicated by arrows.) (A) Pins are too short. Continuous forces exerted by the point against the wall of the bone causes the pins to migrate backward carrying with them the distal fragment. This will result in distraction and non-union. (B) The pins are of the proper length. Lateral pressure is exerted by the shafts of the pins against the wall of the bone. This results in good fixation and permits the shaft of the bone to telescope upon the pins so that the muscle pull of the extremity can produce compression of the fractured surfaces to stimulate good healing. (C) Pins too long. Note that the pins have crossed a second time so that the points are impinging, forklike, against the wall of the bone. Some bone absorption at the fracture site occurs during the period of healing. The fracture surfaces may thus be held apart to prevent compression with the result of delayed or non-union.

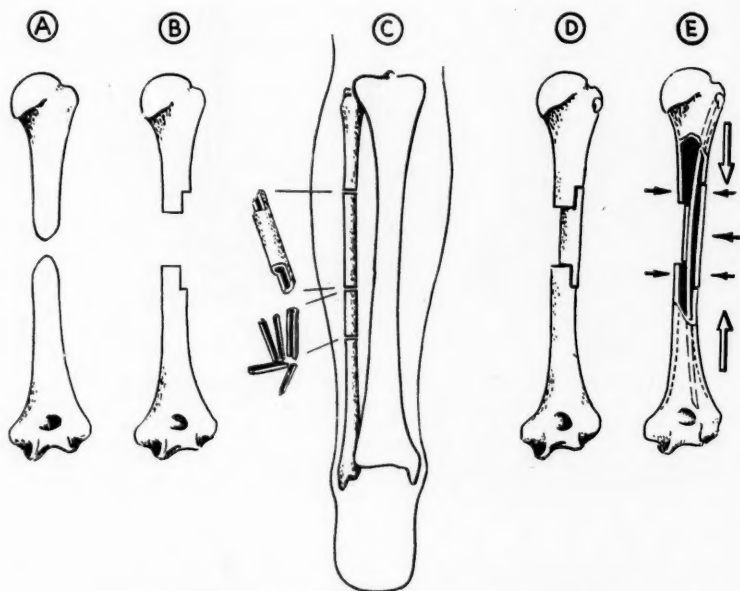


Fig. 9. *Dynamic Forces in Medullary Pinning of Tubular Bone Graft.* (A) Non-union with bone defect, shaft of humerus. (B) Ends have been stepped to receive bone graft fashioned as a key. (C) Showing how the tubular bone key and splinter grafts are fashioned from the shaft of the fibula. (D) Tubular key graft has been fitted into defect and fixed by medullary pin  $\frac{3}{16}$  inch in diameter. The graft is slightly longer than the defect. It is fitted into position as traction is exerted on the lower fragment. (E) Diagrammatic drawing showing dynamic forces. (White arrows) If the graft is of sufficient length, muscle pull results in compression of the ends in direction indicated. (Black arrows) Dynamic spring force exerted by the pin itself results in lateral pressure of each extremity of the graft against the shaft. The splinter grafts are placed peripherally about each extremity of the key graft. This method is applicable to the humerus, radius, and ulna.

## ATTEMPTED ABORTION WITH RUPTURE OF UTERUS

Report of a Case in Which Uterus Was Repaired

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THE incidence of abortion is as varied as those reporting. During the last few decades this figure has been further clouded by a rising rate of induced abortions. The desire to avoid carrying the pregnancy to its normal completion has led those pregnant to submit to a great variety of "treatments" in an effort to interrupt the gestation. The present day use of antibiotics and sulfa compounds keeps many of these from being subsequently seen by reputable physicians. However, bizarre complications arise at times as attested by the following case of an attempted induced abortion upon a woman who thought she was pregnant but was not.

This 24 year old married white woman, para 0, was first seen Sept. 25, 1948. Her last menstrual period was Aug. 2, 1948. History was noncontributory. Her physical condition was satisfactory, with the pelvic examination revealing a uterus normal in size, shape, and consistency—but retroflexed. Since the missed period was the only presumptive sign of pregnancy, she was instructed to return in three weeks. It was thought a diagnosis of pregnancy might be established, if present, at this time.

On October 12, she was admitted to Crawford W. Long Hospital at 4 a.m. because of vaginal bleeding with slight cramping. At 1 p.m. she was discharged with subsidence of symptoms and signs.

The patient was readmitted to the hospital on October 19. Information revealed she had consulted another physician in a neighboring town two days prior to this. He informed her that she had passed a fetus, but that the placenta was still intact.

She continued to bleed and cramp moderately. Temperature was 99.2, with normal pulse, respiration, and laboratory findings. She was diagnosed as "incomplete abortion" and scheduled for a dilatation and curettage the following day.

The operation was performed under sodium pentothal anesthesia with minimal bleeding. The uterus was still retroverted and retroflexed, in mid-position, but normal in size and consistency. The cervix was closed, but easily dilated with a Goodell dilator. On introducing sponge forceps into the uterus some tissue was found which on gentle traction was brought into the vagina and identified as ileum.

Under pentothal sodium and curare an immediate laparotomy was performed. Only a very small amount of clotted blood and sanguineous fluid was noted in the peritoneal cavity. There was no free bleeding. A segment of ileum 24 inches long was stripped from its attachment with the mesentery.

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The bowel of this loop had a bluish black discoloration with the torn ends of the vessels apparently thrombosed. Part of this loop was incarcerated in the uterus through a transverse laceration of the uterus at the level of the bladder attachment (utero-vesico-peritoneal fold) of a retroflexed uterus. The bladder was not injured. The uterus did not appear gravid upon inspection or palpation. The ileum was released and the laceration of the uterus, which was not thought to be from examination of minutes before, was repaired with two layers of chromic sutures. The bladder was advanced over the defect. The avulsed loop was resected and an end to end anastomosis performed. Blood loss was possibly 50 cm. One unit of plasma and 500 cm. of whole blood were given on the table, and Wangenstein suction was begun upon return to her room. The immediate convalescence was good with no resulting gastrointestinal complications. The patient was dismissed on the fifth postoperative day in good condition.

She was next seen Nov. 26, 1949, with a diagnosis of intra-uterine pregnancy with an estimated date of confinement on June 3, 1950. There were no indications of threatened abortion nor of difficulty with the uterine scar during the pregnancy. She delivered spontaneously a 5 pound, 10 ounce girl on May 8, 1950. Labor and puerperium were entirely normal.

This is reported as a case in which there was apparently an attempt to "criminally abort" a nonpregnant uterus, with a resultant perforation of the uterus complicated by stripping of ileum with incarceration of a loop of intestine inside the perforated uterus.

The operation produced no hemorrhage or shock. The repair of the uterus, rather than a hysterectomy, permitted a subsequent pregnancy which continued normally for eight months to spontaneous delivery. It is believed the early transfusion and early use of Wangenstein suction is largely responsible for the uneventful recovery.

The patient was again seen on June 4, 1951, with a second intra-uterine pregnancy. She is progressing normally.

## DIAGNOSIS AND TREATMENT OF CARCINOMA OF RECTOSIGMOID AND ANORECTAL AREAS\*

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THE patient with cancer of the rectum or sigmoid may not be interested to know that 8 to 12 per cent of all cancers of the body and that 65 per cent of all cancers of the large bowel are in this area. What will interest him more is that he has a form of cancer in which the five year cure rate, depending on the type of case, varies from 30 to 90 per cent and averages better than 50 per cent. This is a figure several times better than that for carcinoma of the lung and stomach and very comparable to that for carcinoma of the breast. Carcinoma of the rectum and rectosigmoid is not only extremely common but also it can be presented to the patient and to his physician as by far one of the most easily recognizable and satisfactorily treated visceral malignancies.

Cancer as such has no symptoms except the cachexia of the advanced stages. The clinical diagnosis of cancer anywhere in the body is made indirectly on the basis of past experience which has shown that a lump or mass in a given area, in a patient of given age and sex, producing a given symptom, is more likely to be cancer than anything else. It is the lump which gives the symptom early. The lump protrudes into the fecal stream where the contents are solid. It is bruised and contused, and with its fragile connective tissue stroma, tears and bleeds. Bleeding is the principal danger sign in carcinoma of the rectum and rectosigmoid. And by the same token, the greatest pitfall in the early diagnosis of rectal cancer is the wishful thinking of patient and surgeon—that the bleeding is due to hemorrhoids. Bleeding rectal cancer shows bright blood, often with a recognizable, sickly sweet smell. The blood is passed with the stool, in the stool, or alone. With the proctoscope, blood is seen to descend from above. In the colon and rectum only two noncancerous lesions are likely to cause bleeding suggestive of cancer, without other differentiating signs. The least important of these is the occasional diverticulum of the sigmoid which becomes ulcerated and bleeds, at times dangerously, without much in the way of diverticulitis. The more important lesion is the benign polyp.

There is no way of telling how many cancers of the rectum and sigmoid begin as polyps. We do know that many frank cancers have nearby polyps which appear benign. We know that in a con-

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Presented before the Symposium on Cancer, University of California at Los Angeles, July 19, 1950.

siderable number of cases cancers of the colon are multiple, either simultaneously or successively, and we further know that most patients with extensive polyps of the colon and rectum develop cancer of the bowel, if the bowel is not removed first. Any polypoid adenoma of the rectum or colon must be removed as a definitely precancerous lesion except in the presence of serious contraindications to operation.

The other symptoms of cancer of the rectum or colon are constipation, diarrhea, any alteration in bowel habit, tenesmus, rectal pain. Alteration in bowel habit is almost invariably seen in cancer of the rectum and rectosigmoid. It may be tendency to constipation, or a change to more frequent evacuations than before, or one alternating with the other. Tenesmus (a painful desire for frequent and ineffectual efforts at defecation) is commonly a late sign and suggests that infiltration of the bowel wall has occurred. Actual intestinal obstruction occurs less often than in higher lesions but produces serious problems when it does. In an occasional patient the occurrence of complete obstruction overshadows all else so that little or none of the foregoing history is obtained and even in apparently acute large bowel obstructions cancer must be borne in mind. Urinary symptoms should be sought, especially in the male, in evidence of involvement of bladder or prostate, and with a view to possible postoperative complications. A considerable number of male patients with early prostatism develop such aggravation of their symptoms after major rectal surgery as to require prostatectomy and it is well to be forewarned and to have a urological opinion before operation.

The fundamental point to remember is that one's index of suspicion must be so high that the occurrence of bleeding, or of any of the other symptoms mentioned, must be a direct challenge to the surgeon to demonstrate the presence or absence of a cancer. If abdominal palpation, digital rectal examination, a careful sigmoidoscopy on a prepared patient, and a satisfactory barium enema are all negative, only then should one entertain a diagnosis other than cancer. We have only to realize that 70 per cent of cancers of the rectum and rectosigmoid can be felt digitally to realize how much literally in our hands it lies to recognize rectal cancer early. Digital rectal examination should be performed with the patient recumbent in the dorsal lithotomy or in the lateral decubitus position. The knee chest position is excellent for anal inspection and for sigmoidoscopy, but in this position the rectum straightens out and the sigmoid falls away. In the dorsal lithotomy position, on the other hand, the rectum is pressed down into the pelvis by the sigmoid and one can palpate lesions far up in the rectum which turn out to be six or



eight inches above the pectinate line, or higher. Sometimes one can feel the induration of a tumor around a bend through the wall of the bowel even when it can not be directly viewed with an instrument. The diagnosis of cancer may usually be fairly certainly made on the basis of palpation. Malignant tumors are usually hard and bleed readily when touched. Except for those in the anus and anal canal they tend not to be painful or tender. Polyps are usually soft and, when firm, must be suspected of being malignant. Rare sessile polyps, even if soft and fleshy, are likely to be malignant. Many cancers show no more than hard dirty ulcers, with a softer rolled edge on one side or other. It is important to observe how much of the surface of the bowel is involved, whether the tumor is anterior or posterior, whether it appears fixed or not to the prostate, urethra, or vagina, whether the levator ani muscles feel thickened and involved or not.

Lesions which can be visualized should be biopsied, due care being taken to biopsy the lesion and not the nearby uninvolved bowel. Radical operations for cancer are not lightly undertaken without histologic proof. The tragedy of a radical operation performed for a benign inflammatory lesion is very real with rectal lesions when a crippling abdominoperineal excision will be done. The likelihood of error, even without biopsy, is small but no time is lost in taking a biopsy since the tissue may be processed while the patient is being prepared for operation.

In the rectum and rectosigmoid, since at least 70 per cent of the lesions are palpable by digital examination, and another 20 per cent will be seen in the sigmoidoscope, the opportunity for positive diagnosis is 90 per cent in rectal and rectosigmoid cancer. The rectum is capacious. The sigmoidoscope has a small field. It is necessary to inspect the bowel advancing and retreating, rotating the ocular end to sweep the circumference of the bowel. In these low lying lesions the x-ray is not often required for diagnosis or localization and is not dependable. Nevertheless we use it almost routinely in order to search for possible concomitant lesions higher in the bowel. Lesions beyond reach of the sigmoidoscope are operated upon without biopsy unless at laparotomy one suspects diverticulitis or endometriosis. In the former case it must be remembered that there is often considerable inflammation in association with a carcinoma, and a biopsy of the periphery of what appears to be an inflammatory mass may fail to show the carcinoma at the center. In any case—and this holds for any operative procedure—it is rarely defensible to abandon an operation because of what appears to be a hopeless malignancy, without first obtaining positive histologic evidence.

The differential diagnosis of cancer of the rectum and rectosigmoid includes benign tumors, diverticulitis, endometriosis, carcinoma of the uterus with extension into the rectum, tuberculosis and lymphopathia venerum. Lymphopathia of the rectum occurs chiefly in colored females, usually in the younger age group. If stricture occurs it is unaccompanied by an intraluminal mass. Woody pararectal induration may occur, but unaccompanied by systemic evidences compatible with malignant spread of the same degree. There is often a history of acute proctitis or rectitis in the past, and finally biopsy, if required, shows no tumor.

Tuberculosis of the rectum is usually painful, multiple sinuses are common, there is a profuse purulent discharge and biopsy may show tubercles.

Carcinoma of the uterine fundus may at times present as a rectal cancer due to invasion but in point of fact, it occurs more commonly that gynecologists operate for supposed carcinoma of the fundus with secondary bowel involvement only to find that they are dealing with a rectal or sigmoid cancer which has invaded the uterus.

Endometriosis may mimic carcinoma in every way and even a frozen section diagnosis of adenocarcinoma may understandably be returned. A history of menstrual exaggeration of pain, bluish discoloration of the nodules, the presence of chocolate ovarian cysts, may put one on guard and ordinarily the bowel mucosa is uninvolved and bowel symptoms not conspicuous.

Diverticulitis of the sigmoid occurring as it does in patients of the same age group as cancer, frequently offers a difficult differential diagnostic problem. Diverticula may simulate cancer in at least three ways. Bleeding has already been mentioned. When it occurs it is massive and episodic and unaccompanied by frank evidences of diverticulitis. Even more confusing is the type of low grade smoldering diverticulitis which produces a stony hard inflammatory mass and a partial obstruction of the sigmoid. There may be alternating diarrhea and of course cramps and distention. Signs of infection in those instances are often minimal. The sigmoidoscope can not be introduced into the lesion. The stools may be guaiac positive. It will help in suspecting diverticulitis if the roentgenogram shows involvement of a long segment of bowel and if there are many diverticula higher in the left colon. Proximal colostomy is often required and unless the primary mass melts away it may have to be explored to make certain that it is not cancer. Finally, as a sequel to repeated bouts of diverticulitis, a stenosing stricture of the sigmoid may occur simulating a napkin ring carcinoma. Unless the history is very clear, exploration may be required even if the stenosis alone does not warrant it.

The frequency of the coincidence of rectal cancer and hemorrhoids, formerly accepted, has begun to be disputed in some quarters. However, it is generally accepted as high, and in some series as many as 75 per cent<sup>1</sup> of patients with carcinoma of the rectum and coincidental hemorrhoids have had a hemerrhoidectomy or other procedure before the cancer was recognized. The moral is obvious—sigmoidoscope all patients before performing even minor anorectal operations.

Before patients are submitted to operation we usually x-ray the chest for metastases and obtain intravenous pyelograms for evidence of ureteral obstruction. If the ureter is obstructed we are forewarned and resect it if the tumor is otherwise operable.

As illogical as extirpative surgery for cancer may be, it is the best thing we have to offer for cancer of the rectum and, in comparison with other cancers of the viscera, a pretty good best. X-ray and radium, except in most unusual circumstances, have nothing to commend them and none of the chemotherapeutic agents thus far offered hold much promise for this type of neoplasm.

While the choice of operation will vary with the site of the lesion, we employ the same preoperative preparation for all cases of carcinoma of the rectum and colon. The patients are given several large cleansing enemas and placed on a low residue diet. Sulfasuxidine is administered 0.25 Gm. per kg. immediately, then 0.25 Gm. per kg. per day in four doses. This may be taken before the patient is admitted to the hospital. We usually eschew purgation as being debilitating and in cases of partial obstruction, dangerous. Mineral oil is not given because it interferes with the action of the enteric sulfonamides. Although there are a few surgeons who still prefer to do their large bowel surgery without sulfonamides, most clinics employ it routinely and Dixon<sup>2</sup> and others attribute to it the lowering of the mortality in colon resections from 12 to 15 per cent 10 years ago, to 2 to 5 per cent at present. Not only does sulfasuxidine lower the bacterial count but it often produced diarrhea which aids in cleansing the bowel. Poth<sup>25</sup> has shown experimentally that if in animals anastomoses are performed with borderline technic the animals are much more likely to survive if prepared with the enteric sulfonamides, and the intestinal wounds heal more rapidly and with less reaction and edema. We employ sulfasuxidine for five to eight days. For the last two to three days streptomycin 0.5 Gm. three times a day is also given by mouth. If streptomycin is given for a longer period of time the intestinal flora may be made resistant. The night before operation and the morning of operation penicillin 300,000 units and dihydrostreptomycin 0.5 Gm. are given intramuscularly.

We feel that at least as important as any phase of the preoperative preparation is the passage of an indwelling intestinal tube, preferably the single lumen type with the mercury bag. If the tube is started down 48 hours before operation and the position checked with the fluoroscope from time to time one seldom fails to pass it to the ileocecal valve or beyond. The indwelling tube has several advantages. The chief is the ability it affords one of controlling the small bowel at operation. The 21 feet of small bowel telescoped on three or four feet of tube forms a few compact coils, stiffened and weighted by the tube, easily packed away and showing no tendency to emerge from the abdomen even when the patient strains. The result is a quicker operation, less handling of the bowel and less trauma and less likelihood of postoperative ileus and adhesions. After operation, suction is maintained until evacuations have been established. The abdomen remains flat, distention is avoided and the production of mechanical small bowel obstruction from adhesions or kinking is made virtually impossible since the tube is not removed until normal peristalsis has been established. If there has been an anastomosis the tube serves as a proximal vent. We do not use complementary or preliminary colostomies in elective large bowel surgery.

When a patient with carcinoma of the rectum presents himself already obstructed, a different course must be followed. Relief of the obstruction usually requires a proximal colostomy. We prefer a transverse colostomy so as not to compromise our subsequent choice of operative procedures. Cecostomy should not be performed to relieve left sided bowel obstructions. The vent is too far away to permit cleansing of the intervening segment and a tube cecostomy does not divert the fecal stream satisfactorily.

A consideration of the pathological features involved provides the basis for a reasonable choice of operative procedure. Carcinoma of the upper rectum and rectosigmoid occurs much more commonly than carcinoma of the rectal ampulla and anal canal and almost all the tumors are adenocarcinoma. Colloid carcinoma forms perhaps 5 per cent of the tumors.

The pathological studies of Dukes,<sup>3</sup> Collier,<sup>4</sup> Grinnell,<sup>5</sup> Gilchrist and David,<sup>6,7</sup> Sugarbaker<sup>8</sup> and others form the basis for our knowledge of the manner of spread of cancer of the rectum. Carcinoma of the rectum and rectosigmoid spreads by lymphatic and vascular metastasis, in both cases by tumor embolism. The lymphatic spread is upwards along the superior hemorrhoidal vessels, laterally along the middle hemorrhoidals and into the levator ani muscles, and inferiorly with the inferior hemorrhoidal vessels to the ischiorectal fossa or to the inguinal nodes.

It has appeared in repeated studies, that except in the lowest lesions, the lymphatic spread is upward and that downward retrograde spread more than 2 cm. below the lower border of the lesion, as measured in the shrunken, fixed specimen, does not occur unless the superior lymphatic route has been obstructed by metastasis. Intramural spread is not significant. Even with the lowest lying lesions, metastases may occur along the superior hemorrhoidal vein to its very origin. By the time operation has been undertaken 60 to 70 per cent of the carcinomas of the rectum and sigmoid show lymphatic metastases and 15 per cent show invasion of the veins. Gabriel's figures from St. Mark's Hospital in London<sup>9</sup> show five year survival rate of 83.9 per cent in tumors not going through the bowel wall, but only 31 per cent in tumors with lymphatic metastases. The necessity for early operation and wide excision is clear enough. It is obvious from this point alone that if possible in any rectal or sigmoid carcinoma the inferior mesenteric vessels should be divided at their origin and, in order to make that feasible, some surgeons have advocated a left colectomy and transverse colostomy to solve the problem of bowel nutrition after division of the inferior mesenteric artery. It should also be obvious that once a lesion is below the pelvic peritoneal reflexion, every resection which does not widely remove the lateral and inferior routes of spread is compromising with cancer. The aim of a cancer operation is to cure cancer and that requires resection of the tumor, the routes of metastasis, and the areas to which metastasis occurs.

The sigmoid is removed with its mesentery and inferior mesenteric artery together with the pelvic fat, the rectum, the levator muscles, the anus, perianal skin, perianal and ichiorectal fat. This is as complete an operation as can reasonably be done. It removes the primary tumor, superior, lateral and inferior routes of metastasis and it can be done in one stage or two. The morbidity is low, since there is no anastomosis, and mortality has dropped steadily so that it should now be well below 5 per cent and the occasional deaths are accounted for largely by the complications of surgery in the aged. Our preference is for general anesthesia and the combined lithotomy-Trendelenberg position,<sup>10</sup> with simultaneous exposure of abdomen and perineum. This saves the time of redraping, saves moving the patient, and if adequately experienced assistance is available, permits a synchronous abdominal and perineal attack. The lower midline incision, from umbilicus to pubis, is quickest and simplest, and affords excellent exposure. The superior hemorrhoidal or inferior mesenteric artery is ligated and divided as high as is consistent with leaving a viable length of descending colon sufficient to reach the midline wound. The colostomy is brought through the



midline operative wound and not sutured to it, being held only by the crushing clamp or by a rubber tube tied into the bowel. The midline wound is closed with interrupted silk, without stay sutures.

A wide perineal excision is performed for low lesions, a less wide one for higher lesions, but all of the levator ani muscle is resected that is possible. The perineal wound is closed about a drain except in carcinomas of the anal canal when so much perianal tissue is removed that no closure is possible.

The early operations for rectal cancer, largely perineal and sacral, the procedures of Hochenegg, Kraske and Quenu were devised to make it possible to resect the tumor without entering the peritoneal cavity. Adequate results in terms of cures were not obtained until Ernest Miles introduced the concept of the abdominoperineal resection with its en bloc removal of the organ harboring the primary lesion as well as the routes of metastasis and the metastatic depots.

Since that time an infinite variety of procedures, perineal, sacral, abdominal, and combinations of these, have been devised and reported. It is not argued that any other procedure can be expected to give better results than the abdominoperineal operation nor is it argued that the operative mortality risk inherent in any of these procedures is less than in the Miles procedure. Most of the other procedures in use today are employed solely because they avoid an abdominal colostomy by preserving the sphincter and re-establishing the continuity of the bowel.

It may be worthwhile to look at several of these procedures. The various sacral operations are rarely performed in this country, either with a sacral anus or with reanastomosis, and in general, although d'Allaines,<sup>11</sup> in France, and others are enthusiastic, these procedures have not been popular in this country. Actually, the abdominosacral operation of d'Allaines with anastomosis through the sacral defect probably permits as radical a resection and an easier anastomosis than the low anterior resection as practiced by Dixon,<sup>2</sup> Wangenstein<sup>12</sup> and others. The advantages and disadvantages are essentially those of the low anterior resection.

The low anterior resection, i.e., abdominal resection of the tumor and anastomosis, is championed by Dixon of the Mayo Clinic, by Wangenstein of Minnesota, and others. It is bitterly attacked by Rankin,<sup>13</sup> Harvey Stone, Lahey,<sup>14</sup> the late Tom Jones,<sup>1</sup> and a great number of others. The proponents maintain that proximally they can and do resect as much bowel and mesentery as do the supporters of the abdominoperineal operation, and that distally they perform the operation when they can resect the bowel 3 to 4 cm. or more



below the tumor and still have a sufficient stump for anastomosis above the levators. Their opponents maintain that there is an inevitable tendency to conserve bowel in order to make an anastomosis possible and point out that the incidence of suture breakdown, abscesses and fecal fistulas is high, with some inevitable reflection in long hospital stay and some increase in mortality. It is even granted by some proponents of anterior resection that there may be an increased risk of recurrence and these individuals claim that it is worth that risk to avoid a colostomy. They maintain that rectal cancer does not spread downward and that unless the very low tumors are subjected to this procedure, the recurrence rate will not be increased. A possible difference in opinions may result from a difference in definitions of rectosigmoid and rectum, since various authors delimit the boundaries of the segments in different ways, most of them offering some opportunity for individual interpretation.

It is of interest that Wangenstein,<sup>15</sup> long an exponent of anterior resection, has steadily moved his lower limit upwards until it is now apparently at 8 cm. above the pectinate line. Garlock,<sup>16</sup> after an extensive trial of anterior resection, except under very unusual circumstances in the treatment of cancer of the rectum proper, employs it, when local conditions permit, for cancer of the rectosigmoid. Sphincter saving operations should rarely if ever be employed for cancer of the rectum below the level of 5 inches from the anal margin, because of the inability to meet the requirements of radicality demanded in the performance of a good cancer operation.

Garlock reports fecal leaks in 5 per cent of his cases. Garlock's recurrence rate in 163 anterior resections is interesting. For carcinomas with lower border: (1) three to five inches from the anus, 42.8 per cent; (2) five to six inches from the anus, 20.6 per cent; (3) six to eight inches from the anus, 4.9 per cent. Many of the recurrences were in the suture line.

Wangenstein<sup>12</sup> actually reports a minority of cases with primary union after low anterior resection. However, a surgeon of Dixon's vast experience<sup>2</sup> (426 cases of carcinoma of the upper rectum and lower sigmoid treated by anterior resection), is convinced of the virtue of this operation. His over-all mortality is 5.9 per cent; in his 270 most recent cases, only 2.6 per cent; and the five year survival, 67.7 per cent. "The operation is sufficiently safe, and radical, for lesions of the upper half of the rectum."

As for the perineal pull-through, sphincter-saving operations of Babcock<sup>17</sup> and Bacon<sup>18</sup> much the same objections may be made against these procedures in addition to the fact that normal sphincter control is not often regained. As Gaston<sup>19</sup> has shown, the afferent

fibers of the reflex arc are in the rectum and are destroyed by the Babcock and Bacon type of resection, so that sphincteric continence would not be expected to be present and the principal object of the operation defeated. Nevertheless, Bacon and Babcock continue to operate on large numbers of patients in this manner and appear satisfied with the results. Bacon reports a mortality of 5.5 to 2.04 per cent and claims 80 per cent of cases are continent. This type of pull-through procedure is insufficiently radical for the treatment of cancer and of doubtful value as an alternative to colostomy.

The next factor affecting survival is the involvement of neighboring organs, vagina, bladder, prostate and small bowel. Sugarbaker's studies show that even when the colon appears densely stuck to another organ the tumor may not always have reached the serosa and in 40 per cent of the cases has not yet involved lymph nodes or blood vessels. When the lesion was quite movable, but attached to another organ, 29 per cent of the cases did have serosal extension. It would appear then that even if a tumor is densely adherent to vagina, uterus, bladder or stomach, cure may still be possible, and contrarily, that even if the tumor is only lightly adherent these organs should be resected since one can not rely upon the adherence being inflammatory. As a matter of fact, in cancer of the large bowel, Gilchrist and David obtained 40 per cent five year cures in 35 cases of extended resection. In females it is good practice to resect the posterior vaginal wall routinely for carcinoma of the rectum. The vagina reforms readily and satisfactorily, resection is made easier, and a more thorough operation performed. If the uterus is adherent a total hysterectomy is performed.

If the bladder is adherent to the tumor, providing one is not dealing with the trigone, it is advisable to excise the adherent segment of bladder, closing the remainder. It may be well at this point to mention the work of Powell,<sup>20</sup> Gilchrist,<sup>21</sup> of Bricker,<sup>22</sup> and of Gallo of Argentina<sup>23</sup> who preceded them by four years. It is possible to resect the rectum, the entire lower urinary tract, to make a new bladder of a loop of extrapolated bowel and to implant the ureters in this, leaving the patient with a fecal colostomy on one side, and a catheterizable urinary sac on the other.

The choice of operative procedure in carcinoma of the rectum and sigmoid may be approached in this way. The abdominoperineal resection, requiring no anastomosis should have least inherent risk, and permitting the widest resection, should have the lowest incidence of recurrence. However, in view of the facts of lymphatic metastasis, it is clear that when a high lying tumor can be widely resected and still leave an adequate rectal stump, an anastomosis may be performed with fair safety. For myself I perform anterior

resection rarely, for lesions which are not entirely above the peritoneal reflexion. And when I do an anterior resection for a lower lying tumor I have a feeling of acute guilt for days because I know the immediate risk has been greater, and then I remain permanently unhappy because I feel I may not have performed a sufficiently radical cancer operation. When anterior resection is performed it is a one stage resection and anastomosis without complementary colostomy. There is one group of patients in whom anterior resections are specially indicated. When hepatic metastasis or other extension make eradication of the tumor impossible, there is no point in being a purist about the treatment of the primary tumor. In such instances there is every reason to perform anterior resection and anastomosis instead of abdominoperineal resection.

It must be remembered that in cancer of the alimentary canal, resection of the tumor is the best palliation. If a tumor of the rectum is causing pain, bleeding or tenesmus, resection with anastomosis or colostomy will relieve symptoms and permit the patient to spend his period of survival with minimal discomfort. If the tumor is incurable there is little point in an abdominoperineal resection. Anastomosis, if possible, is the optimal procedure, subject to the surgeon's estimate of the risk of obstruction due to local recurrence. If anastomosis is not performed, the rectum may be transected and closed over below the tumor, sparing the patient the perineal portion of the procedure.

A word about colostomy is in order. Colostomies are abhorrent to patients generally because the only connection these people have had with colostomy has been with a patient who had a colostomy for inoperable cancer. The entire community knows of the poor wretch who returns from the hospital bedridden, malodorous, dying with cancer, afflicted with a colostomy. The same townspeople know nothing of the individuals walking in their midst, well of their cancers, and scarcely incommoded by their colostomies. When patients no longer wear colostomy bags and when colostomies are "trained" to evacuate only once a day, or once every two days, there is no need to compromise with cancer in order to avoid a colostomy.

The question of open versus closed anastomosis deserves a little attention in lesions of the rectosigmoid and sigmoid. When closed aseptic anastomoses within the abdomen finally became possible, the mortality of colon surgery began to decrease and it seemed obvious that a closed, uncontaminated anastomosis must be better than the open anastomoses, with their infections, abscesses and fistulas. When Firor and Jonas in 1941<sup>24</sup> first reported on the use of the insoluble enteric sulfonamides, one frequently heard the comment that in a way this was a bad thing because people would think they could

get by with careless bowel surgery and open anastomoses. It is distressing to have to admit, within limits, that these predictions have been substantiated. With preparation of the bowel with the enteric sulfonamides, with systemic penicillin and streptomycin, it is possible today for the surgeon and his patient to escape with practices that would have been fatal 12 years ago. There is no reason not to expect the closed anastomosis still to give superior results. I use the closed anastomosis over Stone clamps almost exclusively but it must be admitted that there are two inherent disadvantages. The first is the greater likelihood of a large turn-in with the closed anastomosis, leading to a smaller stoma. The second is the occasional transfixion of the far wall of the bowel in the suture, occluding the lumen altogether. One may fairly state that even with the various drugs, the danger of infection, abscess, peritonitis and fecal fistula remains less with the closed anastomosis than with the open but that its proper execution requires a somewhat greater degree of craftsmanship.

As for proximal colostomy, in the prepared patient, with an indwelling intestinal tube in place, it is no longer required. Obstructive resections are almost never performed at our hospital. The risk, morbidity and discomfort and expense to the patient of multiple stage operations appears not justifiable. Nothing is more disheartening than to have a patient survive a resection and die of a colostomy closure. But that is the inevitable fate of a few of the old people subjected to multiple stage procedures.

Finally, a word about carcinoma of the anus and anal canal. Curiously enough, in the high rectum, males more commonly have cancer than females while in the anal canal females are more often afflicted. In the anal canal proper the lesions are invariably adenocarcinomatous. There is no argument about the treatment of these lesions. It is abdominoperineal resection with a very wide perineal excision and with consideration of prophylactic inguinal gland dissection.

About the anus, squamous cell and basal cell carcinomas and malignant melanomas occur. The squamous and basal cell cancers if merely about the anus may be treated by wide local excision. These are skin tumors and may be treated like similar lesions elsewhere unless they are neglected, extensive lesions. If invasion of the anal canal occurs one is forced to a radical abdominoperineal resection with inguinal dissection. Squamous cancer of the anus is frequently preceded by a benign lesion like a papilloma often of long duration. Squamous carcinoma may occur in a fistula of long standing and occasionally where these fistulas are multiple and neglected the gradual development of the carcinoma may be unnoticed.

Formerly one saw diffuse anal cancers resulting from long continued irradiation for pruritus ani.

Melanosarcoma is rare and unusual and extremely malignant. We have had two instances. The first, in a man, recurred in the perineal wound before it had healed. The second was operated upon eight months ago with a massive resection of skin and fat so that it was impossible to close any portion of the perineal wound. Despite the fact that the tumor arose at the mucocutaneous junction, as do all malignant anorectal melanomas, the specimen removed by abdominoperineal resection showed metastases to a lymph node several inches higher.

### SUMMARY

Carcinomas of the rectum and rectosigmoid are lesions which are highly curable by noncrippling operations. A high index of suspicion in diagnosis and a carefully planned operation will bring their own reward. Abdominoperineal resection is the operation of choice in the majority of instances.

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## TUBERCULOSIS OF BONES AND JOINTS IN CHILDREN\*

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SINCE 1937, 172 patients with tuberculosis of the bones or joints have been admitted to the State Hospital for Crippled Children (Carrie Tingley Hospital) in New Mexico. Eight per cent of the crippled children admitted have tuberculosis of bones and joints (compared to four per cent in New York City in 1944). During the first eight years of the hospital, most of the bone and joint tuberculosis was treated conservatively by bedrest and immobilization. During the past five years there has been an increasing amount of surgical treatment of tuberculous lesions, affording a good opportunity to study the patients treated by immobilization and bedrest compared with those treated by surgery. The most obvious difference was economic. The patient treated conservatively had approximately four times as many hospital days for hip and spine tuberculosis and twice as many hospital days for knee tuberculosis as the patient treated by surgery. A second important factor is that many of the children treated conservatively spent a good part of their childhood in bed. The psychological effect on the child resulting from chronic invalidism, pain and debilitation is harmful.

Added to the economic loss and the psychological effect of long years of invalidism, there are many undesirable physical effects resulting from bedrest and immobilization of the diseased part, such as: (1) General debility, (2) poor muscle tone, (3) osteoporosis, (4) herniation of epiphyseal plates,<sup>4</sup> (5) bone atrophy and growth disturbance resulting in marked leg length discrepancy, (6) genitourinary calculi, and (7) metastatic spread of tuberculosis to other joints and organs.

Most of us have been taught that tuberculosis of the bones and joints should be treated by so-called conservative nonsurgical methods. Many of the old teachings still cling to us. Calot<sup>3</sup> said, "If you open tuberculosis you thereby open the door for death." Rollier's<sup>5</sup> slogan was, "Every tuberculosis can be healed if we have only the patience not to operate." Most of us have seen the disastrous results following a surgical procedure with secondary infection in a tuberculous bone or joint. However, since we now have powerful antibiotics and chemotherapeutic agents, we may change our concepts of the treatment of tuberculosis of bones and joints and get rid of

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some of the old taboos that had their origin in the days when antibiotic and chemotherapeutic aids were not available. Many of the advantages of early surgical treatment were brought out by Erlicher<sup>2</sup> in 1935.

Early diagnosis of tuberculous lesions of bones and joints and, when possible, early surgical removal of the tuberculous foci, followed by antibiotic therapy, bracing and early ambulation, will eliminate many of these undesirable sequelae.

The diagnosis of tuberculous arthritis should be kept in mind when any child develops a painful hip or knee, especially when there is evidence of active or old pulmonary tuberculosis. Clinically, the knee is painful and swollen with a boggy texture of the paracapsular tissues. There is a mild increase of local heat. The range of motion is reduced because of pain and muscle spasm. The anterior-posterior and lateral stability is normal or slightly increased. The patella is usually freely movable, but motion causes pain. The circumferences of the thigh and calf are reduced due to muscle atrophy. In the old fibrous knee, there will be a limited amount of painful motion, atrophy of the thigh and calf but no increase of local heat over the knee or boggy texture. The old lesion of the hip is almost always accompanied by a flexion-adduction contracture. An early lesion will elicit decreased range of motion due to pain. An early spinal lesion will elicit pain on deep palpation and on manual head and neck traction as well as attempt to move the spine passively or voluntarily.

The early x-ray findings are: osteoporosis of the bones around a joint, increase in expansion of the capsule and enlargement of the soft tissues about the knee. In the late stages, the x-ray findings are: advanced osteoporosis, narrowing of the joint space, destruction of the non-weight bearing and frequently weight bearing, surfaces of the joint combined with further expansion of the capsule. In the old "burnt out" tuberculous arthritis in which there has been a great deal of fibrous tissue reaction, there will be no expansion of the capsule and there will be atrophy of the soft tissues, especially the muscle masses. It is not uncommon to find an increase in leg length in tuberculosis of the knee, from half an inch to one inch, due to the increased vascular supply accompanying inflammation. This is true only if the epiphyseal plates have not been herniated or damaged by the disease.

Aspiration of the joint, followed by study of the smear, culture on Petragnani medium and guinea pig inoculation should be done.

Surgical inspection of the joint often discloses the typical grayish granulation tissue and the femoral condyles and tibial plateaus will be partially or wholly covered with pannus. If there is no joint de-

struction, removal of all diseased tissue, including granulations, should be done. The patient is protected with penicillin and streptomycin before and after surgery.

Two meter posterior-anterior and lateral x-rays of the chest should be taken, fasting stomach washings and thorough investigation made for pulmonary tuberculosis. If tuberculosis of a knee has been proved and the hip or spine becomes painful, be suspicious of multiple tuberculous lesions, as the incidence is about 10 per cent. Frequent urinalysis should be done, as genitourinary tuberculosis and renal and bladder calculi are common complications. The patient who has been treated conservatively often will have hyperchromic anemia, a leukocytosis with the predominance of lymphocytes and an elevated sedimentation rate. In the healing stages, the sedimentation rate and lymphocyte count goes down.

The following are the prerequisites for surgical treatment of bone and joint tuberculosis:

1. Little or no fever.
2. No active pulmonary lesion.
3. Low sedimentation rate.
4. Rest, adequate nutrition, blood transfusion and general support.
5. Streptomycin and para amino salicylic acid.
6. Immobilization of the affected part.

Unless there is complete removal of the diseased tissue, there might be reactivation of the disease and formation of sinus tracts. Gentle handling of tissue and clean, sharp dissection will help prevent a hematogenous spread due to surgical manipulation, although this complication must be rare. Gentle debridement and meticulous avoidance of the epiphyseal plate will prevent growth disturbance.

Tuberculosis of the knee in children usually starts in the lining membrane of the joint. Partial or complete synovectomy and removal of the infected tissue, followed by antibiotics and a long leg brace with rigid knee and free caliper ankle will allow early ambulation. Later, between the ages of 12 and 15 years, a knee fusion can be done if necessary.

Early synovial tuberculosis of the hip joint may be treated by removal of diseased synovia and cartilage followed by antibiotic therapy; however, there is usually more destruction in the tuberculous hip when first seen, necessitating eventual fusion. The hip joint is more vulnerable to early destruction because it is a tight joint

and increased intracapsular pressures soon interfere with the vascular supply.

Tuberculous foci should be removed surgically to help prevent local and metastatic spread. In a review of 172 tuberculous patients, 10 per cent had multiple lesions of bone. In children too young to have hip fusion, removal of diseased tissue followed by streptomycin and para-amino-salicylic acid is preferable to the long term conservative treatment. Immobilization is effected by a spica cast for several weeks and then motion of the hip joint is encouraged. If the disease process can be stopped, the joint can be saved. If the hip joint has been destroyed, intra- and extra-articular fusions should be done.

Tuberculosis of the spine involves the vertebral bodies primarily with early collapse and deformity. Early diagnosis and immobilization in casts or Bradford Frame is indicated until the sedimentation rate approaches normal and the patient is in good clinical condition. This is followed by early fusion, using the patient's bone or bank bone, fusing two vertebrae above and two below the lesion. Calve<sup>1</sup> brought out that premature osteosynthesis does not shorten the duration of tuberculous spondylitis. He believed that it delayed the evolution, but did not arrest it. I believe this is true if the fusion is done when the patient is in a poor condition and without antibiotic therapy. If, however, general supportive measures are given and the patient is in good physical condition with a healing lesion and, also, if streptomycin and para-amino-salicylic acid are given, it has been my experience that the fusion shortens duration of the disease. It is certainly far superior to the old treatment with casts or heliotherapy. Tuberculous spondylitis most frequently occurs in the dorsal vertebral bodies. This is a difficult area to approach to remove the lesion; however, sequestra should be removed and large abscesses evacuated if necessary to eliminate chronic sinuses. Draining sinuses are no contraindication to surgery. The sinus tracts and infected tissues should be completely resected at, or preferably before, the time of the fusion. When the vertebral bodies are completely destroyed one or more neural arches may be safely removed before fusion of the area. Partial correction of the gibbus often results. The use of bone from the bone bank greatly facilitates spinal fusions, but autogenous bone is preferred.

#### SUMMARY

1. The surgical treatment of tuberculosis of the bones and joints has many advantages:

- A. There is a great saving in time and money because the treatment period is much shorter.

- B. The patient is spared the psychological trauma of chronic invalidism.
  - C. The following complications are frequently avoided: (1) General debility, (2) poor muscle tone and soft tissue atrophy, (3) osteoporosis, (4) herniation of the epiphyseal plates and bone atrophy resulting in marked leg length discrepancy, (5) genitourinary calculi and infection, and (6) metastatic spread to other bones, joints and organs.
- 2. The patient must be in good physical condition and be protected with antibiotics pre- and postoperatively.
  - 3. The surgery must be carefully performed with special emphasis on aseptic technic and complete removal of the diseased tissue.
  - 4. An attempt should be made to save joints with an early tuberculous infection by surgical removal of the diseased tissue preceded and followed by antibiotics.

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## CANCER OF THE CERVICAL STUMP

### A Plea for its Early Recognition and Prevention\*

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CANCER of the cervix uteri developing following supracervical hysterectomy has shown a noticeable increase in our clinic during the past 18 months, comprising 13 per cent of all cancers of the cervix. That the disease must have been present at the time of the original surgery was evident in some cases. In this report we wish to present some of the problems in management and point out certain preventable errors in making the original diagnosis.

In 1931 Von Graff advocated total hysterectomy as the procedure of choice when it was necessary to remove any part of the uterus.<sup>4</sup> At that time he made a plea that this be done as a prophylactic struggle against cancer. Healey and Arneson in 1935 pointed out the difficulties encountered in managing these patients.<sup>9</sup> Meigs in 1936 reported 26 patients with carcinoma of the cervical stump and emphasized that the common procedure of coning out the endocervix as a method of preventing cancer was of little or no therapeutic value.<sup>7</sup> This method fails to remove the squamous portion of the cervical epithelium, the most frequent site for development of cancer. Ward called attention to the fact that 80 per cent of cancers of the cervix originate in the portio vaginalis and advised total hysterectomy if the cervix was suspicious after study.<sup>5</sup> A brief review of the literature of the past 10 years shows that 318 carcinomas of the cervical stump have been reported developing following supracervical hysterectomy.<sup>1-9</sup> To this group we add 43 cases.

Symptoms of cancer of the cervical stump are essentially those of cancer of the cervix, the major symptom being that of bleeding, ranging from postcoital spotting to profuse hemorrhage. Seven of our 43 patients complained of pain as one of the symptoms at the time of admission. In 1 patient it was the only symptom referable to her disease.

Herbert Spencer in 1902 was the first to recognize the coexistence of fibroids of the uterus and cancer of the cervix. Since that time Foss and Babcock and others have stressed this point.<sup>3</sup> In our group

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of patients, hysterectomy had been performed for fibroids, chronic pelvic inflammatory disease, or abnormal uterine bleeding. The frequency with which excessive vaginal bleeding occurs in the presence of fibroids apparently was confusing in 10 instances of coincidental cancer. In so far as we could ascertain from questioning the patients and checking their previous records, only 2 patients had cervixes which the surgeon thought suspicious enough to warrant a biopsy prior to performing a supracervical hysterectomy. One of these patients had five biopsies, all of which were reported to be negative for cancer. A second patient who showed extensive carcinoma of the cervix involving the vagina, one month after a supracervical hysterectomy, had one negative biopsy. Obviously, the site of this biopsy was improperly selected or the specimen was unsuitable for examination. A review of the patient's record showed that the biopsy was taken with a cautery and was considerably charred when it reached the laboratory.

TABLE I  
*Reports of Carcinoma of the Cervical Stump*

Authors	Number Cases	Coincidental Carcinoma	Subsequent Carcinoma
Cosbie	62	24 — 38.7%	38 — 61.3%
Watkins	15	7 — 46.6%	8 — 53.4%
Von Graff	45		
Ward	61		
Behney	67		
Meigs	26		
Pearse	35	7 — 20%	28 — 80%
Healey and Arneson	67		
Total cases in 10 years	318		
Braund and Green	43	18 — 41.9%	25 — 58.1%

The period of time used as a yardstick in evaluating whether one is dealing with a true cancer of the cervical stump or with cancer which was coincidental at the time of surgery may be open to some debate. Cosbie is of the opinion that if cancer develops within three years following supracervical hysterectomy, it is coincidental cancer.<sup>1</sup> He reported 24 of 62 cases of cervical cancer as coincidental. Twenty of his cases developed evidence of their disease within one year after operation, and 15 had advanced cancer which he felt could have been easily detected had proper vaginal examination been made. Watkins reported 7 out of 15 patients with cervical stump cancer had recognizable cancer of the cervix within one year after surgery.<sup>2</sup> Ward is of the opinion that if cancer develops clin-

ically within one year of surgery it is coincidental cancer.<sup>5</sup> Foote and Stewart in their report on the anatomical distribution of cervical carcinoma point out that early cancer of the cervix may be present for a long period of time without showing any clinical manifestation.<sup>12</sup> Stevenson and Scipiades and also Schiller report similar findings.<sup>11,10</sup> We are of the opinion that if cancer of the cervical stump can be recognized clinically within two years after previous surgery, it was coincidental at that time and could have been demonstrated if adequate biopsy material had been obtained. Eighteen (43 per cent) of our patients had well established cancer of the cervix within two years of their previous surgery. In 12 instances the disease was clinically evident within one year. In 4 instances the disease was evident within one month. One of these patients had extensive vaginal involvement; a second had complete fixation of the pelvic soft parts due to tumor infiltration. The failure to perform an adequate pelvic examination or to make the proper evaluation of the findings is self evident. The following case is illustrative.

M. A., colored female, aged 38 years. Admitted July 21, 1949; expired Aug. 11, 1949. *Present Illness.* For five months the patient had noticed irregular menstrual bleeding with a few episodes of menorrhagia. She consulted a private physician, and a hysterectomy was performed about two and one-half months prior to the present admission. Following the operation she continued to have moderate vaginal bleeding and became progressively weaker. For the past month she noted the passage of urine per vagina.

At physical examination, temperature was 100 F., pulse 124, respiration 24, and blood pressure 110/60. The patient appeared weak and anemic. Physical examination was essentially negative except for the pelvis. This revealed a large necrotic crater in the posterior portion of the vagina obliterating the cervix and involving the vaginal wall. Urine was seen coming through this area.

Laboratory reports showed 1,720,000 red cells with less than 3.5 Gm. hemoglobin, white cells numbered 3,200. Non-protein nitrogen was 64.

Biopsy from the crater on July 27, 1949, revealed squamous cell carcinoma.

The diagnosis was squamous cell carcinoma of the cervical stump, clinical group IV. The patient was given supportive therapy, blood transfusions, and three x-ray treatments to control the bleeding. She expired Aug. 11, 1949.

Patients with coincidental cancer usually present symptoms which might be interpreted as cancer of the cervix if the condition were kept in mind. Unfortunately, some patients may be considered as being too young to have cancer, or they may have fibroids of the uterus, or they may have a long history of menstrual discomfort, all of which leads the examining physician to make an erroneous diagnosis, or at least fail to recognize the possible seriousness of the disease encountered. The ages of our patients range from 25 to 76 years. There were 4 patients 35 years of age or under. Thirty

were between the ages of 36 and 55, the period in which carcinoma of the cervix is most prevalent. Six patients were over 55 years of age.

The fact that pelvic pathology can be found which might be the etiological factor in the production of the vaginal bleeding or blood-tinged discharge should not be considered as final evidence that the patient does not have cancer. Though irregular vaginal bleeding at the time of the menopause is frequently encountered, one should be most careful to demonstrate that this blood is coming only from the uterine cavity and not from the cervical canal or the cervix itself. Even then the possibility of cancer of the corpus must be kept in mind. Occasionally pelvic inflammatory disease may be confused with cancer of the cervix. One of our patients who died from cancer within one year after a supracervical hysterectomy was operated upon with this diagnosis. A patient who continues to bleed after a supracervical hysterectomy is inclined to believe that this may be a natural sequela from her surgery. Occasionally the inexperienced physician may share the same belief.

An evaluation of the clinical grouping of our patients may shed some light on the duration of their disease. Three of our patients were classified as Group I at the time the diagnosis was made. Seven were Group II; 9 were Group III, and 8 were Group IV. The remaining patients were not classified. In our clinic we use the League of Nations classification of cancer of the cervix. The fact that 17 of these patients had far advanced disease, 8 or approximately one-fifth of whom were almost beyond any hope of salvage, leads us to conclude that the disease had been present for many months.

#### TREATMENT

Cancer of the cervical stump presents many therapeutic problems. The small percentage of five year survivals is evidence of this difficulty. We should like to discuss it under the headings of prevention and definitive therapy. The most desirable treatment is cancer prophylaxis. The cervix which has been removed cannot develop cancer.

We are cognizant of the fact that there are times when a supracervical hysterectomy is indicated. The presence of large myomata extending into the broad ligaments may make it difficult or impossible to remove the entire cervix and close the vaginal cuff. Patients who have had long standing pelvic inflammatory disease may present technical problems which make it unsafe to completely remove the uterus. Patients who have advanced cardiac disease, diabetes, or chronic nephritis might carry too high a surgical risk should a total hysterectomy be performed. Nevertheless, we are of the

opinion, and it is routine in our clinic, that every patient who must have the corpus removed should have a total hysterectomy if at all feasible.

A review of the operative schedule of any active hospital will show a sizeable list of patients who have had a supracervical hysterectomy combined with either a cauterization or conization of the cervix. Many of these patients must have had a diseased cervix or the vaginal procedure would not have been performed. Biopsy material obtained from cauterization or conization may be inadequate for recognition of cancer of the cervix unless it is obtained with a cold knife. Carcinoma in situ or early cancer is so destroyed by removal with the cautery that it is impossible for the pathologist to recognize this early disease. To simply cauterize the cervix without obtaining material for histological examination will hide the true diagnosis.

When the surgeon has a patient upon whom he plans to do a supracervical hysterectomy, it is imperative that he perform a careful pelvic examination prior to surgery. This should include not only digital examination, but also visualization of all parts of the vulva, the vagina, and the cervix. Should the cervix be found to bleed easily or to be granular, firm, irregular, or cystic, a biopsy should be obtained.

To obtain an adequate biopsy one need not give the patient an anesthetic. Stewart and Foote in discussing the anatomical distribution of cervical carcinoma suggest an excellent procedure in the detection of early cancer of the cervix.<sup>12</sup> With a good biopsy forceps one should take a specimen from the anterior lip, posterior lip, and from each lateral border. If carcinoma is present, a biopsy in this manner will be positive in over 90 per cent of cases regardless of the stage of the disease. The fact that many of our patients went to surgery without the benefit of cervical biopsy is evidence of an inadequate work-up or the failure to consider the possibility of cancer. Should the biopsy be negative in the presence of what clinically might be cancer, we are of the opinion that surgery should be deferred until the possibility of cancer has definitely been ruled out.

Once carcinoma of the cervical stump has become evident, we are faced with the problem of curative therapy. Healy and Arneson pointed out the anatomical difficulties encountered in treating cervical stump cancer.<sup>9</sup> The cervical canal, being very short, makes proper distribution of radium difficult. The majority of these patients are best treated with deep x-ray therapy given through external ports and in some instances supplemented by the use of intravaginal cone therapy. Shortly after completion of x-ray therapy, radium is implanted.

Simple surgical removal of the cervical stump is of little value. It might suffice occasionally in carcinoma in situ or in Grade I carcinoma. The complications of such a procedure are more common. Vesicovaginal and vesicoureteral fistulae occur in a higher percentage of cases. Stenosis of the ureter due to surgical trauma also is more prevalent. The advanced cervical stump lesion in some instances might be amenable to the surgical technic of radical exenteration of the pelvis. Smith states that 75 per cent of patients with carcinoma of the cervical stump die with the disease.<sup>13</sup>

### SUMMARY

In reviewing the literature of the past 10 years, reports of 318 cases of cancer of the cervical stump were found. To this group we add 43 cases seen at the John Gaston Hospital during the past 10 years.

Cancer of the cervical stump comprises 13 per cent of all cervical cancers seen in our clinic.

Eighteen of 43 patients (43 per cent) had their cancer of the cervix at the time the supracervical hysterectomy was performed. In 12 patients the disease was clinically evident within one year; in 4, within one month.

The failure to perform an adequate pelvic examination and to obtain a biopsy from the cervix resulted in errors in diagnosis. A negative biopsy in the presence of a suspicious lesion should be repeated.

Excessive or abnormal vaginal bleeding or discharge in the menopausal and premenopausal period should suggest the possibility of cancer and warrants a careful investigation. Age does not exclude the possibility of cancer. Many of our patients were in the premenopausal period.

The best treatment of cancer of the cervix is prophylactic. When a hysterectomy is needed, let it be a total and not a supracervical one if at all feasible.

Once cancer of the cervical stump is present, its treatment is difficult. The best results have been obtained by the combined use of external roentgen and radium therapy.

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## TALCUM POWDER GRANULOMA\*

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THE use of talcum powder in surgery is dangerous because of the granulomatous adhesions which are provoked in tissue by the presence of talcum. Numerous reports have appeared to substantiate this property of talc.<sup>1,2,3,4,5,6</sup>

Seelig<sup>7,8,9,10</sup> and his group searched for a talc substitute and discovered the desirable physical characteristics of cornstarch, but also found an undesirable characteristic of gelatinization when this material was sterilized by autoclaving. An appeal was made to the corn products industry for help in solving the problem. While this work was being carried on, it was recommended that potassium bitartrate, or ordinary cream of tartar, be used as a substitute for talcum. This substance has many disadvantages, but is harmless in small amounts when introduced into the peritoneal cavities of laboratory animals.

A new product was obtained by eliminating the undesirable property of starch and this substance was evaluated by Lehman<sup>11</sup> and his co-workers who proved its advantage. Biosorb absorbable powder is the name given to this cornstarch product.

Talcum powder granuloma could be eliminated if surgical gloves were dusted with this absorbable powder instead of talcum powder. Talcum powder is still used in some hospitals because its market price is less than that of Biosorb, but this is false economy. One wage earner with recurrent intestinal obstruction represents a far greater economic loss to the community than the loss represented by purchase of absorbable powder. We are reporting the following case with the hope that the danger of talcum will be more widely appreciated.

### CASE REPORT

E. C., a 28 year old colored male, was admitted to Parkland Hospital on Sept. 29, 1949. His chief complaints were epigastric pain and abdominal distention. The epigastric pain had begun eight hours prior to admission. The pain was intermittent and cramping. The periods of cramping were 1 to 2 minutes apart. The abdomen had become distended. There had been no vomiting. It was learned that he had had a normal bowel movement 24 hours prior to his admission.

It was also learned that the patient had an appendectomy in 1936 while residing in San Antonio, Texas. His next operation was in 1943 when he was

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admitted to another Dallas hospital with the diagnosis of large bowel obstruction. A sigmoid volvulus was found and an obstructive resection was performed. The colostomy was closed one month later. Since 1943 the patient had suffered periodic recurrences of cramping abdominal pain, occasionally associated with distention, but not with vomiting.

Physical examination revealed a well developed and fairly well nourished young colored adult male who appeared to be in acute distress. Observation revealed the presence of dorsal kyphoscoliosis. The second most obvious feature was the abdominal distention which was thought to be moderate for his habitus. There were no areas of point tenderness and no muscular rigidity was elicited. Auscultation of the abdomen revealed hypo-active peristaltic sounds. Two scars were observed on the abdominal wall. One was in the right lower quadrant and was transverse in direction and the other was a left vertical paramedian.

X-ray examination was made and was reported as follows: (1) Mechanical intestinal obstruction considered to be of small intestine, and (2) The possibility of a volvulus of the sigmoid colon can not be eliminated.

Levin and Miller-Abbott tubes were passed and the patient became comfortable within three hours; the abdominal distention was markedly decreased in 24 hours. The patient was given intravenous fluids as a supportive measure.

On September 30 the patient was subjected to an exploratory laparotomy. Dilated loops of small bowel were present and the colon was distended over the midsigmoid where a volvulus was present as the result of firm adhesion of the sigmoid to the anterior parietal peritoneum. This area of adherence was the site of a granulomatous mass involving both parietal peritoneum and the serosa of the sigmoid. A portion of this granulomatous tissue was removed for microscopic study. The volvulus was reduced after liberating the sigmoid colon. No other significant findings were discovered. The patient made an uneventful recovery from the operation and was able to be discharged on Oct. 6, 1949.

Microscopic examination of the excised adhesion revealed the presence of a granulomatous reaction. When the preparation was studied under polarized light it was possible to identify crystalline material in considerable amounts confined to the granulomatous foci. A diagnosis was made of talcum powder granuloma.

On October 19 the patient was again admitted to the hospital with complaints of epigastric cramping pain, abdominal distention and vomiting. A Miller-Abbott tube was passed and the symptoms abated. The patient was discharged three days after admission with the diagnosis of mechanical small bowel obstruction due to adhesion.

A gastrointestinal x-ray study and barium enema were done on October 31 but no abnormality could be made out.

On November 13 the patient was readmitted for the third time, suffering from epigastric cramping pain, which underwent intensification every two or three minutes. This pain was present six hours prior to admission. Shortly after the onset of pain his abdomen became distended and he vomited several times. No flatus was passed after the onset of pain. Physical examination revealed marked abdominal distention with dilated loops of intestine. Auscultation of the abdomen revealed high pitched peristaltic sounds. There was no point tenderness in the abdomen. An x-ray examination of the abdomen

showed multiple distended small bowel loops containing fluid and gas. A Miller-Abbott tube was passed and the patient was comfortable within 30 minutes. The distention gradually subsided and on Nov. 17, 1949, an exploratory laparotomy was performed. Multiple small bowel loops were adherent to the anterior parietal peritoneum. The loops were freed and a portion of adhesive band was removed for microscopic examination under polarized light. This segment of tissue was found to contain talcum powder.

The postoperative course was complicated by a wound abscess and a persistent abdominal distention which lasted for about 10 days. The patient was discharged in good condition on Dec. 1, 1949.

#### SUMMARY

1. A report of a case is given which reveals the danger of using talcum powder in the operating room. The adhesions which produced the obstruction were found to contain talc when examined microscopically under polarized light (figs. 1 and 2).\*



Fig. 1. Section of adhesive band taken without polarized light. X 500.



Fig. 2. Same area as figure 1 taken with polarized light. The talc is shown as brilliant particles. X 500.

2. Many cases of intestinal obstruction are operated upon and adhesions are found to be the cause. We believe that a rather high percentage of these would reveal talc if examined under the proper conditions.

\*We thank Dr. Alice Smith for her help in obtaining the photomicrographs.

3. Biosorb<sup>12</sup> is a recognized substitute for talcum powder and should replace this dangerous agent.

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## PRIMARY TORSION OF THE OMENTUM\*

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**T**ORSION of the omentum presents itself as a partial or complete rotation of the organ on its long axis, accompanied by more or less strangulation of the omental vessels. Two types, primary and secondary, are observed. The latter may be distinguished by the fact that some abnormal condition, especially adhesions or hernia, may be assigned as the causative agent. The origin of primary torsion is unknown, though several predisposing factors are recognized, *i.e.*, obesity,<sup>4</sup> trauma, excessive activity, particularly rotary movements of the body,<sup>3</sup> and hemodynamic forces.<sup>2</sup> These factors may work separately or together. The right half of the omentum, being longer than the left, apparently is peculiarly susceptible to their influence, since this half is almost invariably the site of the torsion. It is noteworthy that nearly all these patients are obese, are in the third, fourth and fifth decades of life, and the vast majority are males.

Primary torsion of the omentum is seldom recognized preoperatively. In the first place, so few cases are observed that the condition is rarely even considered as a diagnostic possibility. Jackson,<sup>1</sup> in 1948, reported 2 cases, bringing the total reported to that time to 72. In the second place, the clinical picture may resemble that of almost any other acute abdominal disease, such as acute cholecystitis, pancreatitis, perforated gastric or duodenal ulcer, strangulated hernia and acute appendicitis. Indeed, with few exceptions, the condition is diagnosed as appendicitis. Thus, even though one might consider omental torsion, the differentiation would be difficult preoperatively.

Pain, either generalized or beginning in the upper or lower abdomen, with localization in the right lower quadrant after a period of hours, is most often the chief symptom. Or, the pain may be localized in the right lower quadrant from the onset, or may begin in this region and radiate across the abdomen. As a rule, the pain is not so severe in the beginning as to require immediate confinement of the patient to bed; rather, it is usually mild or moderate, and may be intermittent during the early hours of the attack. A number of authors mention the fact that relief is obtained by rest in the prone position. Nausea, generally without vomiting, anorexia, gaseous distention and urinary frequency may be reported. Fever and leukocytosis of varying degrees may also be associated. Palpa-

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tion of a mass may be impossible, especially if the patient is obese. Tenderness and rigidity, more pronounced at McBurney's point, will be elicited. Although the symptoms may be acute from the onset, in the majority of cases they persist for one to four days before the patient comes to surgery.

Exploration will usually reveal bloody fluid in the peritoneal cavity, from interference with the circulation by the omental torsion. The right half of the omentum may be twisted on itself several times, and will be more or less discolored, also from damage to its blood supply. The treatment consists of excision of the involved segment of the omentum, with ligation of the pedicle.

#### CASE REPORTS

CASE 1. Mrs. J. H., aged 35, gave a history of lower abdominal pain of three days' duration. She had had a similar but milder attack, lasting only a short while, three weeks previously. The present pain was more severe in the right lower quadrant, but radiated across the entire abdomen, and was aggravated by walking or stooping. She had no digestive complaint, no nausea or vomiting, no loss of appetite and no disturbance of bowel or urinary function. She had consulted several doctors, who had made various diagnoses, as appendicitis, cholecystitis and disease of the ovaries.

The patient's appearance was better than one would expect from the history. Her weight was 235 pounds. Her temperature was 100.8° F., and the leukocyte count was 10,400. Considerable tenderness and rigidity were elicited in the lower right abdomen, but no mass could be palpated. The examination otherwise was essentially negative. A diagnosis of acute appendicitis was made and the patient was placed in the hospital for operation.

The abdomen was opened through a McBurney incision. A large quantity of serosanguinous fluid was encountered in the peritoneal cavity. The appendix was essentially normal. Because of the fluid, it was our impression that we were dealing with an ovarian cyst which had become twisted on its pedicle, or some type of intestinal obstruction with gangrene. The incision was therefore enlarged for better exploration. The presence of the fluid was immediately explained by the discovery of a torsion of a large portion of the right half of the omentum. The segment had undergone three complete turns and appeared almost gangrenous. It was excised and bleeding was controlled by ligation of the pedicle. Exploration revealed no other abnormality. The appendix was removed prophylactically before closure of the abdomen. The patient's recovery was satisfactory in every respect.

CASE 2. Mrs. R. A. L., aged 40, had developed a pain in the upper abdomen four days before her admission to the hospital. After 24 hours, the pain had localized in the right lower abdomen. She had no nausea or vomiting, but was troubled with much gas and distention. A colon irrigation had been given, with some relief of the gaseous condition. The pain had continued, however, and she was sent to the hospital with a diagnosis of acute appendicitis.

The patient did not appear acutely ill. She was obese, her weight being 184 pounds. Her pulse rate was 100, temperature 100° F., leukocyte count 9,500, and differential blood count within normal limits. The urine was essentially negative. The abdomen was extremely tender in the right lower quadrant and



some rigidity was present, but no masses could be palpated. She was prepared for operation in the belief that the condition was an acutely inflamed appendix.

When the abdomen was opened, a small amount of bloody fluid was found. The appendix was slightly thickened, but not grossly diseased. Further investigation disclosed that a segment of omentum the size of one's hand had become twisted four complete turns on a fairly narrow pedicle and was semigangrenous. All the other abdominal organs were apparently normal. The involved portion of the omentum was excised and the pedicle ligated. The appendix was then removed and the abdomen closed. The patient was discharged from the hospital on the twelfth postoperative day, following an uninterrupted recovery.

#### COMMENT

Although the vast majority of individuals with primary torsion of the omentum are males, both the cases herein reported were in women. The clinical picture in both was typical, *i.e.*, the patients were within the usual age limits wherein the torsion develops; they were obese, and the symptoms were those of an acute abdominal condition, beginning with a moderate pain localizing in the right lower quadrant and increasing in severity. The fact that the pain continued for three days in one and four days in the other without producing pronounced physical reactions, such as nausea and vomiting, a high fever and leukocytosis, was also typical and should have suggested a diagnosis of an omental torsion. Our error is explained by the fact that the pain and tenderness were localized in the right lower quadrant and that our experience with omental torsion has been limited to these 2 cases. Once the abdomen was opened and the sanguineous fluid discovered, some type of vascular obstruction was of course suspected.

Since the symptoms of omental torsion are those of a surgical abdomen in any case, failure to make a correct diagnosis preoperatively is not of serious concern. One should, however, be cognizant of the possibility, in order that the omentum may be included in the exploration for the source of the sanguineous fluid and the patient's symptoms.

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## ADENOMYOMA OF PYLORUS SEEN AT AUTOPSY TWO YEARS AFTER OPERATION FOR PYLORIC STENOSIS IN A NEWBORN GIRL BABY

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A TWO YEAR OLD white girl, who died suddenly of pulmonary embolism, was examined postmortem and the pylorus was found to contain an adenomyoma. By "adenomyoma of the pylorus" is meant a tumor containing heterotopic glandular elements surrounded by bundles of smooth muscle. Woolsey and Millzner<sup>1</sup> give the following description: "Microscopically, glandular structures are found throughout the submucosa and the muscularis or throughout both. These glandular structures are frequently grouped into bundles of varying sizes. Many alveoli appear relatively undifferentiated. These are lined by dark staining cells with round to oval nuclei which ranged from cuboidal to columnar in shape. The cells, although undifferentiated and embryonic in character, appear active. They resemble the lining cells of the biliary and pancreatic ducts rather than gastric or intestinal mucosa. Differentiated alveoli resembling either pancreatic acini or Brunner's glands are also present. Usually all three types are found, but any one may dominate the picture."

### ETIOLOGY

Our belief conforms with that of most pathologists who believe that adenomyomas are developmental aberrations and have probably existed over the entire lives of the involved individuals. Post-mortem studies indicate that this is not a postoperative effect. Wollstein<sup>2</sup> studied 23 infants at autopsy at periods from 24 hours to two years after Fredet-Rammstedt operation. She failed to find evidence of adenomyoma. Downes<sup>3</sup> experience in 30 autopsies was similar to that of Wollstein.

### CASE REPORT

Past medical history revealed that one week after birth she began to vomit; this resisted treatment and became projectile and followed feedings by about 30 minutes.

Physical examination was negative, except for the presence of a typical gastric peristaltic wave seen in the epigastric region following feeding, and pro-

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gressing from left to right. X-ray examination immediately preceding operation showed the stomach to be large and slightly dilated. The pyloric channel was elongated and narrow, attributed by the roentgenologist to hypertrophic pyloric stenosis. In spite of the active peristalsis, the stomach emptied very slowly and in two hours only about 10 per cent of the barium had entered the small intestine.

A Fredet-Rammstedt operation was performed at the age of four weeks by one of us (F.J.W.). At operation a tumor,  $2\frac{1}{2}$  by  $1\frac{1}{2}$  cm., was found, the greater portion of which was on the greater curvature side of the pylorus.

Following operation, vomiting ceased permanently and the child had no gastrointestinal symptoms prior to death.

#### STOMACH AT AUTOPSY

The stomach was not dilated. It was not displaced or distorted. The mesentery on the lesser curvature contained seven lymph nodes, each of which measured 7 by 3 by 2 mm. The serosa of the stomach was free of exudate and adhesions. A special effort was made to detect a pyloric scar, but none was seen. On the greater curvature side of the pylorus there was a nodular thickening (fig. 1) which measured 1.8 cm. in length and 1.3 cm. in width. The

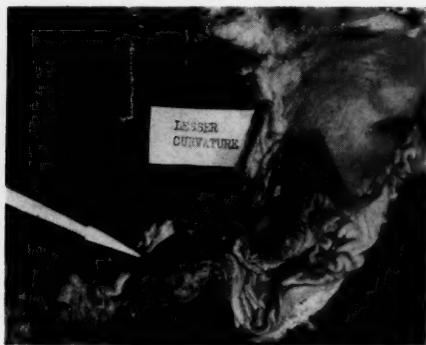


Fig. 1. Nodular circumscribed mass in pylorus.

surface was finely nodular and it was covered with a few short, loose fibrous adhesions. The stomach was opened on the greater curvature, and the swelling in the pylorus was opened through the anterior surface. When opened, the pyloric canal was found to measure 3.5 cm. in circumference, and the wall was irregular in thickness. On the greater curvature side, it measured 1.3 cm. in thickness, but the superior half measured .6 cm. in thickness. The inferior half was occupied by a circumscribed mass, the longer dimension of which lay in the pyloric axis. The mucosa was thrown into folds of the usual size; it was gray in color except for a few folds in the body where there was moderate congestion. The mucosa of the pylorus was thrown into shallow folds. The margin of the pylorus was irregular on the inferior portion because of the mass. The attached portion of the duodenum was normal.

## MICROSCOPIC DESCRIPTION

Sections through the portion with nodular swelling showed: (1) mucosa that was narrow and which had the majority of glands cut transversely and a few near the surface cut longitudinally, and at one place it had a large irregular gland lined with columnar epithelium (fig. 2); (2) submucosa that was seen only in places as loosely arranged fibrous tissue containing blood vessels and nodules of lymphatic tissue, and at one place it had an island of pancreatic tissue (fig. 3); (3) an inner, thickened, circular muscle layer, measuring 14 mm., that contained many glands of the Brunner type lined with tall columnar epithelium (fig. 4); some were large and stood alone; two of these had many endothelial foam cells in the lumen; one was surrounded by loosely arranged stroma that stained more deeply blue; others were arranged in clusters made up of glands that varied in size from normal to those greatly distended; the larger glands contained structureless, stringy secretions and desquamated epithelial cells; mitotic figures were absent.

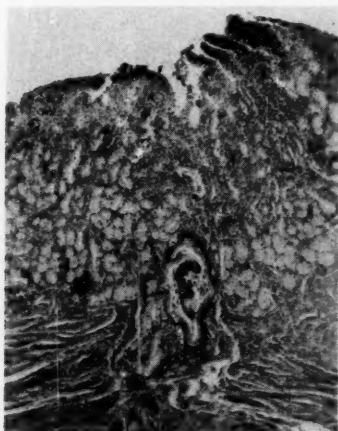


Fig. 2. Large, irregular gland in mucosa.

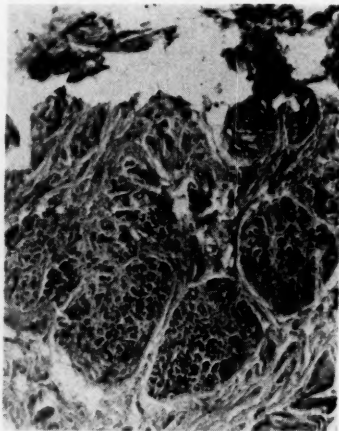


Fig. 3. Island of pancreatic tissue in submucosa.

Sections through the portion without nodular swelling showed: (1) narrow mucosa with normal glands, (2) broad submucosa with collections of glands that were uniform in shape and size and were of the normal Brunner type, and (3) an inner circular layer of muscle, measuring 2.9 mm., which was free of glands.

## DISCUSSION

The gross description of the pylorus as seen at autopsy correspond closely with the pylorus as described in the surgical record. In both instances, the pyloric enlargement was noted to be mainly on the greater curvature side of the sphincter. It is our belief that an adenomyoma existed at the time of operation, but this was not

proved by biopsy. Rodgers<sup>4</sup> had 1 proved case of adenomyoma of pylorus in a girl, aged 10, who had vomited almost every day since the age of two months, with periodic attacks of flatulence and sometimes pain in the left iliac fossa, relieved by vomiting. There was prominence of the epigastrium after meals and well marked gastric peristalsis, but no tumor was felt. Skiagram showed the stomach to be greatly dilated with considerable delay at the pylorus, but there was no deformity in this area. His patient was treated by partial resection of the stomach.

Bernardes de Oliveira<sup>5</sup> reported a case of adenomyoma of pylorus in a girl aged 26 who complained of pain in the epigastrium for five months. It was intermittent, severe at times without relation to eating. At other times she had nausea and a pressing on her stomach. She would vomit food eaten some days before. She lost 40 pounds of weight. Her symptoms were relieved by partial resection.



Fig. 4. Brunner type gland in thickened circular muscle layer.

In our case, the Fredet-Rammstedt procedure was a successful mode of treatment, suggesting that muscle spasm was an important factor in symptomatology, as it is in congenital hypertrophic pyloric stenosis.

#### SUMMARY

1. A case of adenomyoma of the pylorus, seen at autopsy two years after operation for pyloric stenosis in a newborn girl baby, is presented.
2. The gross description of the pylorus as seen at autopsy corresponded closely with the pylorus as described in the surgical record.

3. It is concluded that the adenomyoma existed at the time of operation.

4. The adenomyoma of the pylorus was the cause of vomiting.

5. The symptoms were relieved by Fredet-Rammstedt operation up until the time of death two years later.

6. The adenomyoma was not related to the child's sudden death.

7. Biopsy of every nodular swelling of the pylorus should be made.

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## THE PREVENTION OF LYMPHEDEMA OF THE UPPER EXTREMITY AFTER RADICAL MASTECTOMY

### A Preliminary Report

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**L**YMPHEDEMA of the upper extremity following thorough removal of the axillary contents has been the subject of numerous articles.<sup>1,2,3</sup> Most of these are concerned with the surgical correction rather than with the prevention of this complication.

Gentle technic in radical mastectomy and its favorable effect in preventing edema of the arm is suggested by Guthrie and Gagnon.<sup>4</sup> However, regardless of all usual precautions, a substantial number of patients will develop clinically apparent edema of the arm. Comparative measurements of the arms of patients following radical mastectomy reveal a surprising number of enlargements on the side of operation. A conspicuously swollen arm may be the only noticeable evidence of a radical amputation of the breast. Rarely, lymphangiosarcoma of the edematous arm may ensue after prolonged periods.<sup>5</sup>

The pathogenesis of lymphedema of the upper extremity following radical mastectomy is not as yet completely understood. Macdonald<sup>6</sup> attributes it to lymphatic obstruction on the basis of axillary phlebitis with perivenous lymphangitis. He advises routine removal of the axillary vein. This, in our experience, neither appreciably enlarges the field of operation nor does it aid in the prevention of edema. Two of our patients, not included in the series, in whom the axillary vein was ligated or excised, developed clinical edema, although the arm was bandaged prophylactically. Mahorner<sup>7</sup> advises against ligating the deep veins of the lower extremity except when the thrombosis is extensive or, when there is danger of pulmonary embolism. The same general principles of treatment would seem applicable also to the upper extremity.

The etiology of indurated leg or of edema of the lower extremity has been better appreciated with venous pressure studies designed to measure pressures during physiologic activity of the limb.<sup>8,9</sup> Valvular incompetence following recanalization of the femoral vein appears to be the most likely explanation for indurated leg. Veal and Hussey<sup>10</sup> in 1940, applied venous pressure tests to the arm in

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patients with obstructed axillary or subclavian veins. In these patients, the venous pressures rise on exercise was approximately 5 times higher in the obstructed vein than in the normal.

It seems likely that axillary thrombosis occurs quite frequently as an early postoperative complication following thorough stripping of the vein. Recanalization of the vein occurs thereafter. Experiments are now in progress to demonstrate this sequence following radical mastectomy. The axillary vein is equipped with two valves in its distal extent. Valvular incompetence following recanalization is probably not as important in the upper extremity as in the lower extremity. Stenosis of the vein is known to occur and the recanalized vein may be greatly reduced in caliber due to adjacent scar from operative trauma. This might also explain why edema is more common following irradiation of the axilla. Local changes in the subcutaneous tissues of the arm and forearm probably develop during the period of axillary thrombosis and act to make the edema permanent. We are now determining what percentage of our patients develop postoperative thrombosis of the axillary vein. It appears to be more frequent in obese women. It may be only coincidental that in another of our series, obese women demonstrated hyperprothrombinemia. It does, however, suggest some causal relationship. We are now studying a series of patients in whom anticoagulants are being used prophylactically against axillary vein thrombosis.

During the past three years, in 50 consecutive patients subjected to radical mastectomy, a snug compression bandage was routinely applied to the corresponding upper extremity and maintained continuously for a period of eight weeks. In all of these patients, the operative procedure was a radical mastectomy as described by Halsted.<sup>11</sup> It included removal of the mammary gland with the pectoral muscles and the axillary contents in block. The Rodman type of incision was considered preferable to the vertical incisions, extending on to the arm. Primary grafts were used in several instances. The arm is bound to the chest by a modified Velpeau bandage until the fourth postoperative day, when the elastic compression bandage is applied. To prevent slipping, elastoplast\* serves admirably. The extremity is wrapped from the distal flexor crease of the palm to as high as the breast dressing will permit. Bandage must be applied snugly enough to prevent any subsequent swelling or to obliterate any early postoperative edema. This can be determined by frequent measurements of the circumference of the arm.

Once the purpose of the bandage has been explained, the patient

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\*Elastoplast is made by the Duke Laboratories, Inc., Stamford, Conn.

complains of no difficulty except for soiling. This bandage does not interfere with movement of the extremity. In all but 2 of our patients, the bandage was maintained for eight weeks. In no case where the bandage was properly used did clinical edema of the arm develop.



Fig. 1. Elastoplast compression bandage applied on the fourth postoperative day. It extends from the proximal flexor crease of the hand to the axilla. The ends are reinforced with ordinary adhesive tape to prevent slipping or rolling.

After removal of the bandage, careful measurements of the circumference of both arms are recorded at subsequent visits. During the past several months, control experiments are under way wherein the arms are measured preoperatively and at regular intervals postoperatively in an effort to substantiate the present claims. Our patients have been divided into three groups. In one of these the arm is not bandaged. In a second group the elastic bandage is used. In the third series only anticoagulants are given.

Some of the earlier patients have now been followed for three years or longer and in no instance did noticeable swelling of the arm occur in those who wore the bandage continuously during the eight-week period. Two patients, who inadvertently removed the bandage after four and five weeks respectively, developed edema of the arm. This further substantiates the assumption that there is a critical period of approximately eight weeks immediately postoperative when compression bandaging of the arm will prevent the development of edema. Occasionally, the arm may exhibit slight swelling even after snug compression for eight weeks, but never exceeding one-fourth to three-eighths inch increase in circumference. The tendency to swelling has never been progressive.

From a study of these 50 cases one might conclude that there is a period following operation when the axillary vein, traumatized

during the dissection, may become thrombosed. It then recanalizes, facilitating venous drainage of the arm. It is our belief that the period in which the edema develops and becomes a permanent feature may extend as long as two months following operation. Compression treatment of the thrombophlebitis of the involved veins will prevent subsequent induration of the arm.

Although the compression bandage has been employed for the past three years, it is only in the past few months that our ideas concerning the pathogenesis of edema of the arm have begun to crystallize. For that reason the experimental data are as yet inconclusive.

### SUMMARY

There is a critical period following radical mastectomy when chronic induration of the corresponding extremity may develop. If swelling can be eliminated during this period, no enlargement or induration of the extremity will occur. The use of a continuous compression bandage to the arm for an eight-week postoperative period is recorded in 50 patients. It is concluded that the routine prophylactic bandaging of the arm is an excellent preventive of chronic indurated upper extremity following radical mastectomy.

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## THE DIAGNOSIS AND SURGICAL TREATMENT OF INTRACRANIAL ANEURYSMS

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**A**N aneurysm within an intracranial artery is produced by the force of the arterial stream upon the faulty wall of the vessel where there is a partial to complete loss of muscularis, elastica, and intima. Such a defect may take the form of a tiny blister or of a pedunculated, grapelike mass, and it may occur anywhere along the course of the vertebral, basilar, or carotid systems, either extracerebrally at the base or within the substance of the brain. Direct injury and syphilis have been named in the older textbooks as common causes of intracranial aneurysms, but there is now adequate proof that such origins of this lesion are very rare. Intracranial aneurysms are almost always a developmental defect in the wall of the vessel, left there during the complex stages of resolution of the intracranial vascular tree, during which times budding, growth, resorption, and constant rearrangement goes on until the final patterns of the vessels are established.

Congenital vascular defects, arteriovenous fistulas, either traumatic or developmental in origin, or weakened arterial walls due to destructive arteriosclerotic patches, are not aneurysms, though they are often loosely so called.<sup>1</sup> Along with this misleading use of names, "acute subarachnoid hemorrhage" stands as a useless, confusing, inadequate term which gives no indication of the cause of the hemorrhage. The sudden appearance of free blood in the cerebrospinal fluid spaces is usually a desperate situation which calls for immediate diagnosis and treatment, the causative lesion commonly being a ruptured aneurysm.

Single aneurysms of considerable size, or aneurysms multiple in number, may be present on the vessels at the base of the brain as incidental autopsy findings, the patient never having had the clinical signs of such a lesion. In fact, the unruptured aneurysm at the base of the brain does not as a rule manifest itself. Usually an aneurysm will produce its first symptoms only after it has leaked blood, and the leak may be so slight as to produce minimal changes in the cerebrospinal fluid, and cause only transient changes in certain of the cranial nerves. Thus, an intact aneurysm, or one which from time to time seeps a small amount of blood, arising from some part of the circle of Willis or its immediate branches, may produce visual field defects through pressure upon the optic nerve, the optic chiasm,

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<sup>1</sup>Presented during the Hollywood Assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951.

or the optic tract. Pressure upon the third, fourth, and sixth cranial nerves may cause pupillary inequality, ptosis, and diplopia through paresis of the involved extraocular muscles. Irritation of the root, ganglion, or branches of the trigeminal nerve may result in pain, paresthesia, or loss of sensory function in the involved area of the face. Similarly, aneurysms along the course of a vertebral or the basilar artery may slowly destroy the last four cranial nerves in such a way as to produce palatal weakness and anesthesia, hoarseness of the voice, difficulty in swallowing, and wasting of one half of the tongue. Such evidence of an irritative and destructive lesion, well localized by its specific neurological changes, demands an accurate diagnosis. Occasionally, calcification may be seen in the wall of an old aneurysm where repeated laminations of clot have become partially calcified, but the finding of such calcification in the best of stereographic roentgenograms is not common. Also, large aneurysms alongside the clinoid processes may produce erosion of the bone, as they may also occasionally do at the foramen magnum. When such signs and symptoms are present the wisest and safest step is to perform cerebral arteriography, for by such a procedure practically all aneurysms of clinical importance may be accurately diagnosed.

When an intracranial aneurysm suddenly ruptures with the outpouring of a quantity of blood, the effects are usually very dramatic and unlike any other intracranial crisis. The patient may have prodromal nausea and headache for a short period of time, and then, without warning, he suddenly suffers a severe intracranial pain and loses consciousness for a few hours or for several days. He may have one or a series of generalized convulsions. Very often there will be no localizing neurologic signs during the immediate post-hemorrhage stage, and it may not be until some time after consciousness has been regained that there will be signs indicating the side of the lesion. At any time after the initial onslaught a carefully performed lumbar puncture will reveal grossly bloody cerebrospinal fluid unless the hemorrhage has come from an aneurysm lying within the cerebral substance or within the intracavernous portion of the carotid, with the blood never reaching the subarachnoid spaces. The bleeding will usually cease spontaneously after the first rupture if the patient is kept quietly in bed, and as he regains consciousness his few lateralizing signs may indicate upon which side arteriography is to be done. A second rupture through the soft retaining clot may occur without warning, even with the patient at rest, and the chances for spontaneous cessation of hemorrhage are much less on second or third rupture than they were after the initial insult. For that reason, arteriography should be done and treatment of



the aneurysm should be given as soon as feasible after the initial rupture.

The patient who has had such a rupture of an aneurysm in the free, basilar portions of the intracranial arteries may never show lateralizing clinical signs. On the contrary, bleeding into the cerebral substance or into the cavernous sinus produces immediate and unmistakable evidence of the location of the hemorrhage. When from an aneurysm in any location there is a massive outpouring of blood into the ventricles, the patient suffers an early respiratory and circulatory collapse, and he dies of respiratory failure after a few hours, in spite of stimulants and the use of a respirator.

There are various technics for the procedure of arteriography, and none of them are without danger, especially in the aged patient, or in the patient with arteriosclerotic vessels. In this country diodrast has almost completely replaced thorotrast as the contrast medium to be injected, but even diodrast in 35 per cent aqueous solution is not without its dangers because of individual sensitivity to the drug. For that reason the possibility of such sensitivity should be tested in every patient with a skin wheal and a drop of the substance in the conjunctival sac before the arterial injection is made. In many persons a direct puncture of the common carotid may be done percutaneously, thus simplifying the procedure surgically. The shadow of the arteries is not so distinct, however, as when the dye is injected directly into the internal carotid which has been exposed through a small incision in the skin of the neck. Occasionally, too, a severe hematoma may form in the neck as a result of a leak at the puncture site when the percutaneous method has been used. The vertebral artery may be approached percutaneously at its location opposite the fifth or sixth cervical vertebrae, or, like the carotid, it may be dissected out and injected under direct view. For successful intracranial arteriography there must be close cooperation between the operating team and the roentgenologists, and certain minimal special apparatus is necessary for this very specialized x-ray technique. Ideally, arteriography is performed under local procaine infiltration, but if that cannot be used then pentothal with an endotracheal tube in place is usually satisfactory. In any event, the adventitia of the vessel should be saturated with procaine to avoid vasospasm during the manipulation of the vessel. Since aneurysms are known to occur in multiple sites or on either side in the same place, some authors have advocated bilateral arteriography before any direct treatment is undertaken.<sup>2</sup>

The treatment of an intracranial aneurysm consists of a choice of two methods, both being directed toward the obstruction of the arterial stream leading toward the lesion. The most conservative

method is that of ligation of the carotid artery in the neck, such a procedure always being done under local anesthesia in order to test the patient's tolerance for such a measure. If the patient shows evidence of continued bleeding, or if there are frequent repeated attacks of hemorrhage, then ligation should be done immediately after arteriography while the artery is still exposed in the neck incision. Great gentleness must be exercised in the procedure of ligation in order not to injure the intima beyond the point of ligation or to fracture or dislodge an arteriosclerotic patch within the vessel at the site of dissection and ligation. Ligation should be double or triple, using heavy black silk. For absolute obstruction of all blood flow through the ipsilateral carotid tree the internal carotid may be ligated at any point between the bifurcation of the common carotid and the entrance of the internal carotid into the base of the skull, the usual point of ligation being just above the bifurcation. If the common carotid is ligated, as may easily be done just below the bifurcation, not all the blood flowing into the internal carotid will be shut off. Fed by collateral branches to their mates of the opposite side, the internal and external maxillary arteries, the lingual, and the superior thyroid arteries will pour a minimal stream of blood into the external carotid and thence into the internal carotid artery. Obviously, therefore, so far as the possible untoward neurologic effects of obstruction of blood supply to one side of the brain are concerned, ligation of the internal carotid is a more drastic procedure than is ligation of the common carotid, though for the purpose of absolute block of the supply, ligation of the internal carotid is the more effective.

In the occasional patient there will be a transient hemiplegia following such ligation, particularly if the patient is an old, arteriosclerotic person or if the blood pressure is low. Such a hemiplegia, if incomplete, usually clears up after a few days. In a series of 110 patients this has happened only six times; in no instance has there been a complete and permanent hemiplegia following any type of carotid ligation. It must again be emphasized, however, that the ligation should be done with utmost surgical gentleness, under procaine anesthesia, and with testing of the conscious patient over a period of twenty minutes for the possible ill effects of the ligation. Hemiplegia coming on several hours after ligation probably means that a clot has propagated from the site of ligation peripheralward into the intracerebral carotid branches, and at such a time release of the ligatures will be of no avail.

There is no rule to be followed in judging from an arteriogram whether or not carotid ligation will produce undesirable neurologic side effects, but it does seem that if the anterior cerebral artery does

not fill during unilateral arteriography, then there must already be a block in the carotid system between the point of injection and the junction of the anterior communicating and the ipsilateral anterior cerebral artery. The patient being without hemiplegia on the opposite side at that time, the anterior cerebral may be assumed to receive an adequate supply from the opposite side, through the anterior communicating artery, thus indicating to some degree the safety of carotid ligation. Fortunately, in most individuals who do not have their aneurysm on the anterior communicating artery or the proximal portion of the anterior cerebral artery, adequate blood will come into the affected hemisphere through the anterior communicating artery.



Fig. 1. A specimen of a large sacular aneurysm of the anterior communicating artery. The main mass is thrombosed. The entire anterior communicating artery is involved in the defect, so that ligation would require that clips be placed on both anterior cerebral arteries, and such a procedure is not compatible with life.



Fig. 2. A coronal section through the brain shows the large, fresh intracerebral clot which resulted from a massive hemorrhage from the aneurysm shown in figure 1.

The approach to a recently ruptured aneurysm through an osteoplastic craniotomy is fraught with many dangers and surgical difficulties. At the site of old or recent hemorrhage all the surrounding structures are stained, and orientation because of that and arachnoidal inflammatory changes is very difficult. Furthermore, there may be fresh and even fatal bleeding when the soft brain is elevated away from the soft, necrotic retaining clot over the site of rupture. It is true that on occasion a blisterlike aneurysm may be trapped between silver clips if a main trunk vessel is not involved, or, if the

aneurysm is sufficiently pedunculated, its base may be clipped so as to leave patent the lumen of the mother vessel. But the security of such clips can never be left unquestioned, since the vessel walls near an aneurysm are soft and swollen and not ideally conditioned for the accurate and secure placement of such a type of ligature. The mortality and postsurgical neurologic defects by such an intracranial approach to aneurysms at the base of the brain are much greater than in the more conservative carotid ligation.

When the aneurysm has been demonstrated to lie intracerebrally, it should be approached through an osteoplastic craniotomy, the cortex should be opened, the clot evacuated, and the vessel ligated on either side of the lesion. This treatment of aneurysms of this sort produces excellent results.

A pedunculated aneurysm on the vertebral artery may be ligated at its base, but trapping of an aneurysm of the vertebral trunk on either side alone usually results in death or, at best, in extenuating neurologic defects of immediate occurrence. Ligation of the basilar artery is not compatible with life. Most aneurysms of the anterior communicating artery result in death after the first rupture, since, being fed by a stream of blood from either side, they have little opportunity to seal over by clot. In the rare instance, aneurysms on this short and vital artery have been trapped between clips, leaving intact the stream into the adjacent anterior or cerebral arteries (figs. 1 and 2).

Certainly the age of the patient, the state of his vessels, and the particular artery involved must all be taken into consideration together with the severity of the effects of the intracranial hemorrhage, before anything so radical as the interruption of carotid blood is undertaken. But a bleeding aneurysm cannot be disregarded; procrastination plays no part in its treatment. Having once ruptured and then ceased to bleed, an aneurysm most certainly will rupture again. One has only to locate the lesion, and then decide whether to risk the patient's life by allowing another such episode, or to risk the uncommon occurrence of some neurologic defect as the result of ligation. The proper choice is obvious.

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## 1951—MEDICINE'S FIRST YEAR OF GRACE

### Convocation Address

ELMER LEE HENDERSON, M.D.\*  
Louisville, Ky.

Mr. Chairman, Fellow Surgeons, and Guests:

As a member and former President of the Southeastern Surgical Congress, I am sincerely pleased to have the honor and opportunity of addressing this annual assembly. For to me this is much more than just a routine speaking engagement before an important medical group. Rather, it is a chance to talk once again with personal friends and professional colleagues of many years' standing.

Added to the personal pleasure in such an opportunity is the professional pride arising from the fact that The Southeastern Surgical Congress has become one of the Nation's outstanding surgical organizations offering one of the best postgraduate courses in the country.

Since its formation in 1930, when only one other surgical association existed below the Mason and Dixon Line, The Southeastern Surgical Congress has moved steadily ahead in its efforts to stimulate active interest in the progress of surgery and allied medical science and to promote closer cooperation among surgeons, physicians, hospitals and all representative groups in the field of medical care.

Through its annual programs which continue to improve year after year, and through its excellent publication, *THE AMERICAN SURGEON*, The Southeastern Surgical Congress not only has been of supreme value to surgeons in the Southeastern States, but also has contributed greatly to the advancement of surgical knowledge throughout the Nation.

The objectives and the accomplishments of this organization are typical of the best in American medicine. They are representative of the American methods and the voluntary progress which the entire medical profession has been fighting to protect and preserve. That fight deserves the active support and participation of every doctor, regardless of his particular niche or scope of practice. For it involves not only the more immediate fate of the medical profession, but the ultimate fate of the entire Nation.

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\*President, American Medical Association.

Presented during the Hollywood assembly of The Southeastern Surgical Congress, Hollywood, Fla., April 11-14, 1951, by Dr. R. B. Robins, Camden, Ark., Vice-President, American Medical Association.

I want to report to you, therefore, on the past, present and future of the American Medical Association's National Education Campaign.

I should like very much to be able to stand here today, and to say to you: "Our National Campaign is all over" . . . "American medicine has won its fight against compulsory health insurance and socialization." . . . "We can forget about public affairs and public relations." . . . "We can relax once again in our respective ivory towers of professional and scientific activity."

It would be a pleasure, I am sure, for me to say those things and for you to hear them. But if I spoke in that vein, I would be indulging in hasty reporting; I would be guilty of slipshod diagnosis; and I would be failing in one of my major responsibilities as President of the American Medical Association.

I can report to you—and this *is* an honest pleasure—that American medicine has made great and demonstrable progress . . . in the fight against compulsory health insurance, in positive actions to help solve medical care problems by voluntary methods and in the drive to gain the approval and support of the American people in both phases of our campaign effort.

However, it also is one of my duties of leadership to warn you that the threat of socialization has not yet been eradicated, that numerous problems remain to be met and solved in a manner satisfactory to the American public, that much work is yet to be done and that medicine still has to win and hold the support of several important segments of American public opinion.

In this connection the excellent little magazine, *Medical Economics*, with which most of you probably are familiar, made some pointed and timely remarks in its December 1950 issue. *Medical Economics*, in an editorial entitled "The Decline of Ewingism," said:

"1950 may go down in history as the last year in which full-scale National Compulsory Health Insurance was a live issue."

Before I continue, let me emphasize that the key word in that paragraph is the word, "may."

For the editorial, after pointing out that the November elections brought defeat to nearly 90 per cent of the congressional candidates who favored Compulsory Health Insurance, then went on to say:

"Thus medicine is given two years of grace . . . two years to accentuate the positive, to extend and improve the voluntary plans, to clinch its case through action as well as through words.

"Once before (in 1946), when faced with a similar opportunity,



we frittered it away. This time let's do the job right. It's the only sure death for Ewingism."

I agree emphatically. *This time let's do the job right.* 1951, in my opinion, should be regarded as only the first half of a two-year grace period, and two years is not a very long time. Neither this year nor next can we relax and rest on our laurels. We must continue all positive, constructive actions which will help to demonstrate, once and for all, that *America's medical care problems are being solved by voluntary methods.*

If we in medicine fail to make this concerted effort, the sequence of events in 1950 and 1952 might prove to be a repetition of 1946 and 1948. And if *that* happens, the drumbeaters for socialized medicine will be out on parade once again, with greater fanfare than ever before. And along with them in the revival march will be all the other salesmen for the assorted wares of State Socialism.

When I speak of those election years, however, I want to stress one very important point. I am not urging either victory or defeat for the Republican or the Democratic party. Like many of you here today, and like thousands of doctors throughout the Nation, I happen to be a lifelong Democrat. I personally do not relish Republican victories at the polls, but at the same time I have less than love for any socializers who masquerade as Democrats. And I am sure that those of you who are Republicans feel the same way about Democratic victories, and about the socializers who hide behind the Republican label.

*What I am urging, inside, outside and all around both major political parties, is complete defeat for the philosophy of socialization, as applied to medicine or any other field of American endeavor.*

For more than two years, medicine's National Education Campaign has been conducted on that nonpartisan basis and it will continue to be so conducted. The demonstrable progress which I mentioned earlier has been achieved only because we took our case directly to *all Americans everywhere*, only because we presented it as an issue transcending all politics and party lines. As a result, medicine's support has come from all segments of America's political, economic and social life.

Medicine's broad, over-all progress in the fight against compulsion is clearly evident in four major events or developments:

*First*, since the beginning of our campaign more than 10,000 national, state, and local organizations, representing a massive cross section of all America, have taken a public stand against compulsory health insurance, or any other form of socialized medicine.

*Second*, last October, during the American Medical Association's

nationwide advertising campaign on the issue of freedom versus compulsion, more than 65,000 companies, organizations and individuals spent over two million dollars to advertise their support of medicine's position, and their faith in American, voluntary methods.

*Third*, last November, in the polling places of America, the people administered specific, pointed rebukes to most of the advocates of Compulsory Health Insurance, and they also threw a large amount of cold water on the general trend toward State Socialism.

*And, Fourth*, the Nation's voluntary health insurance plans have been growing and improving at an accelerated pace during the past two years, and all reports indicate that they still are gaining momentum.

All four of those developments represent a tremendous amount of effort, progress and success. But they also point the way to a number of undeveloped areas and undone tasks. In the realm of public opinion, there still is a need for affirmative, educational effort, especially among specific groups. And in the practical solution of medical care problems, there still is a vast amount of work to be done, not only in the field of voluntary health insurance but also in other fields involving the supply of medical service.

Despite the widespread public support which already has been mustered, medicine has not yet enlisted all the potential help which is available from the labor unions and working people of America. We *know* that scores of labor leaders and millions of rank-and-file workers agree with our stand against socialized medicine in particular, and socialism in general. One of our major tasks this year is to bring that latent support out in the open, *expand it*, and *crystallize it into official actions and resolutions by labor organizations*.

As you probably know, dramatic progress in that direction was revealed last December at the A.M.A. Clinical session in Cleveland. At that time, Mr. William L. Hutcheson, General President of the United Brotherhood of Carpenters and Joiners of America, announced that his union's Twenty-sixth General Convention had voted down a resolution to support the Truman National Health Program.

Mr. Hutcheson, who also is a Vice-President of the American Federation of Labor, denounced socialized medicine and the entire socialistic philosophy of compulsion. He analyzed both of them as a serious threat to the rights and freedoms of labor and all other groups in America. And he said that he was happy to take a stand beside us in our fight for our convictions.

This courageous action by Mr. Hutcheson and the Carpenters' Union, which has 700,000 members, now calls for a vigorous fol-

low-up. It should be regarded as the opening gun, the precedent, the example, for a barrage of similar actions by labor leaders and unions all over the country. We must take the Hutcheson message to every state, district and local labor leader and labor organization in America. No other single activity will do more to hasten the final tolling of the bell for Ewingism.

According to the wage earner forum, a continuous study of labor thinking conducted by the Macfadden Publications, nearly one-half the Nation's wage earners already are opposed to socialized medicine, and more than one-fourth still are undecided. By simple arithmetic, therefore, it is obvious that vigorous effort could win us the support of three fourths of American workers. And while we are at it, we might as well try to convert the remaining one-fourth, who now favor socialized medicine.

If we are to gain complete, permanent victory over Ewingism, we not only must win strong support from American labor, which has been the main target of Government propaganda, but we also must get that support translated into *official, outspoken, public* action by labor unions, action that will penetrate the skulls of any politicians, planners or national labor leaders who still refuse to recognize public opinion.

Meanwhile, there are some other areas in which soil remains unturned. On the distaff side, despite the fact that over 5,000 women's organizations have taken a stand against socialized medicine, we have not yet won enough support from such important groups as the Parent-Teacher Associations, the League of Women Voters, the American Association of University Women and the Nurses' Associations. There is a need for much more grass roots action by local units of those groups.

Medicine has received staunch help from the American Dental Association, The American Bar Association and many of their state units. But here again we should try to bring about closer relationships among physicians, dentists, lawyers and all other professional people who face the common threat of regimentation.

In order to expand and strengthen our position with labor, women's groups, other professions, and *all* of the American people, it will not be enough to present the case *against* socialized medicine. We must demonstrate by *actions*, as well as words, that we recognize the existence of certain problems *and that we are doing something about them*.

In this sphere of positive, practical action, our major objective is to promote the maximum growth and development of all sound voluntary health insurance plans. Low-cost, comprehensive protection

must be made available to every individual, regardless of where he lives, where he works, or what the color of his hair may be. Until that is done, many people will continue to flirt with the simple alternative of a Government system which promises everything for nothing.

Another problem—and it is one which has been aggravated and given added prominence by the present national emergency—is the matter of financial aid for medical education. This is another area in which we must *prove* that American, voluntary methods can do the job.

The Board of Trustees of the A.M.A., at the Cleveland Session, took the lead by appropriating half a million dollars as the nucleus of a fund to be raised for the aid of medical schools throughout the Nation. Pointing to the dangers of Federal interference, the Board of Trustees said:

"There is a growing public awareness that Federal subsidy has come to be a burden, not a bounty, for it is bringing intolerable increases in taxation, and is dangerously increasing Federal controls over our institutions and the lives of our people."

The Board expressed the hope that its action will stimulate other professions, industries, businesses, labor groups and private donors to help swell the fund for medical education and it urged all American doctors to contribute individually and to take the lead in obtaining contributions from other sources.

In still other areas, involving patient-physician relationships, we must push the extension and full development of state and county programs for providing 24-hour emergency medical service, settling complaints of patients, placing doctors in communities which need them, eliminating excessive fees, and improving medicine's public relations in every way possible.

We must do all of these things faster and better than ever if we are to make the most of our two-year grace period, and bring about the final death sentence for Ewingism.

And regardless of what the present international crisis may bring in the way of tragedy, sacrifice and patriotic duty, let us keep our long-range sights clear. Let us hold to our fundamental conviction that freedom and initiative must be restored, and preserved, when World peace is once again assured.

## STREPTOMYCIN TREATED AND CONTROL THORACOPLASTIES

A Follow-Up Study of the 1947 Series\*.

JAMES D. MURPHY, M.D.

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Oteen, N. C.

**I**N December 1948<sup>1</sup> we presented an evaluation of streptomycin as a protective agent against spreads, reactivations, and wound infections following thoracoplasty for pulmonary tuberculosis. That study was based upon a series of 49 patients who had a thoracoplasty with streptomycin as a protective agent and 50 alternate control patients operated without streptomycin. The series began in February 1947 and ended in April 1948. At the conclusion of the study it was decided that streptomycin was not necessary as an adjunct to the routine thoracoplasty operation.

Coincident with the thoracoplasty study, an evaluation of the use of streptomycin as a protective agent against empyema, fistula and spreads following pulmonary resection for tuberculosis was made. The latter study has been continued to the present time and now comprises a series of 195 pulmonary resections. Each of these patients received streptomycin for a week before and two weeks after operation. In the early patients of the series the results were so good and complications so few that a great deal of enthusiasm was aroused.<sup>2</sup> Similar favorable results were reported by many other large thoracic surgical centers. As the series grew in number, and experience in pre- and postoperative care expanded, we have been disturbed to find that complications such as bronchopleural fistulas, empyemata, and wound infections have occurred with increasing frequency. In attempting to resolve this paradox we were confronted with the necessity of evaluating the influence of streptomycin upon the problem. This was particularly important since our early good results were obtained in patients who had received no streptomycin treatment prior to their resection.

At the present time nearly 100 per cent of the patients who are submitted for resection have had one or more previous courses of streptomycin in treatment of a pulmonary lesion. Complications in this group are much more numerous than in those patients who had no streptomycin prior to their prophylactic resection course.

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\*Reviewed in the Veterans Administration and published with the approval of the Chief Medical Director. The statements and conclusions published by the authors are the results of their own study and do not necessarily reflect the opinion or policy of the Veterans Administration.

In the hope that further light might be obtained on this problem we returned to the group of 49 streptomycin treated and 50 control patients who had a thoracoplasty during the study conducted in 1947. Two years have now elapsed since those patients were operated upon. An analysis of what has happened to them in subsequent months might give us valuable information. This study takes into consideration: (1) sputum conversion resulting from the thoracoplasty per se in each group, (2) total sputum conversions after subsequent supplemental operations, (3) late extension or progression of the disease, (4) complications after supplemental operations in both resistant and sensitive patients, and (5) deaths, both early and late.

PERCENTAGE OF SPUTUM CONVERSIONS RESULTING FROM THE  
THORACOPLASTY PER SE IN EACH GROUP

An interesting comparison can be drawn by studying the percentage of sputum conversions in the streptomycin treated group and the control group as reported in the fall of 1948 (table I-a), and the alteration that has occurred in these groups after an 18 month follow-up study was made (table I-b).

TABLE I  
*Sputum Conversions in Total Thoracoplasty Series*  
(August, 1948)

Table I-A

	Patients	Sputum Conversion	
		No.	Per Cent
Streptomycin Group	49	32	65.3
Control Group	50	26	52.0

*Sputum Conversion in Patients Having Thoracoplasty as Their Only Major  
Surgical Procedure*  
(February, 1950)

Table I-B

	Original No. of Patients	Patients Having Thoracoplasty Alone	Sputum Conversion	
			No.	Per Cent
Streptomycin Group	49	39	33	67.4
Control Group	50	37	30	60.0

In table I-a, it is apparent that the streptomycin treated patients in 1948 showed a greater percentage of sputum conversions than did the controls. Reference to table I-b demonstrates that the treated patients still enjoy the greater number of sputum conver-



sions when the cases receiving thoracoplasty alone are analyzed. Further comparisons of these two tables demonstrate that the incidence of sputum conversions with thoracoplasty alone has actually improved for both the streptomycin study group and the control group. The most relevant point in the comparison of these two tables, however, rests in the fact that the incidence of late sputum conversions was higher in the control group than in the streptomycin treated group. The results obtained in the control group were apparently more lasting than those in the treated patients.

#### TOTAL SPUTUM CONVERSIONS AFTER SUBSEQUENT SUPPLEMENTAL OPERATIONS

In table I, both early and late results were analyzed on those patients having thoracoplasty as their only major collapse procedure. Table II-a includes all patients, in both the treated and the control groups, who had a supplemental major surgical procedure performed for control of their residual disease.

TABLE II  
*Per Cent of Sputum Conversions in Total Series Accomplished by  
Supplemental Operations  
(February, 1950)*

Table 2-A

	Original No. of Patients	Patients Having Supplemental Operation	Conversion in Total Series from Supplemental Operations	
			No.	Per Cent
Streptomycin Group	49	10 (20.6%)	7	14.3
Control Group	50	13 (26.0%)	12	24.0

#### *Sputum Conversions Obtained by Individual Supplemental Operation*

Table 2-B

	Pulmonary Resections			Cavernostomies		
	Patients	Conversions No.	Per Cent	Patients	Conversions No.	Per Cent
Streptomycin Group	8	6	75.0	2	1	50.0
Control Group	8	7	87.5	5	5	100.0

Ten (20.6 per cent) of the original 49 patients in the streptomycin treated group required supplemental operative procedures. Eight pulmonary resections and two cavernostomies after the

method of Eloesser were done. Six (75.0 per cent) of the 8 patients having pulmonary resection have converted their sputum. One (50.0 per cent) of the 2 patients having cavernostomy has a negative sputum.

Thirteen (26.0 per cent) of the original 50 patients constituting the control group were given subsequent surgical treatment (table II-b). Of these, 8 received a pulmonary resection and 5 had the Eloesser type of cavernostomy performed. Seven (87.5 per cent) of the 8 patients upon whom a pulmonary resection was done converted their sputum. All (100.0 per cent) of the 5 patients receiving cavernostomy had converted their sputum at the time of late follow-up.

TABLE III

*Total Sputum Conversions Including Patients That Have Had Supplemental Major Surgical Procedures*

	Patients	Sputum Conversions	
		No.	Per Cent
Streptomycin Group	49	40	81.6
Control Group	50	42	84.0

The total rate of sputum conversion, 18 months after the original evaluation, in both the streptomycin treated and the control group now shows a greater number of sputum conversions (84.0 per cent) than does the streptomycin treated group (81.6 per cent). In our opinion three factors contribute to this reversal of the original results:

1. The relative increase in the number of patients who showed a delayed sputum conversion was greater in the control than in the treated patients.
2. A greater number of supplemental operations were carried out in the control group than in the treated group.
3. The percentage of complications was greater in the streptomycin group.

The increase in number of late sputum conversions found in patients of the control group having thoracoplasty alone was relatively small. The supplemental operations also showed a margin of only 3 in favor of the control group. In order that the reversal of end-results might be more adequately explained, an analysis of late extensions of the tuberculous process and of the relationship between complications occurring after supplemental operations and streptomycin sensitivity or resistance was made.

TABLE IV  
Parents Having Late Progression of Disease

Original No. of Patients	Total No. with Late Progression of Disease	Streptomycin Status at Time of Progression		
		Sen.	Res.	Assumed Res.
Streptomycin Group	4	Progression Subsequent to Thoracoplasty		
		2	1	1
		Progression Subsequent to Supplemental Operation		
Control Group	2	2	1	1
		Progression Subsequent to Thoracoplasty		
		2	2	
		Progression Subsequent to Supplemental Operation		
		0		

TABLE V  
Comparison of Complications Following Supplemental Operations

Operations	Patients Having Supplemental Operations	Complications							Streptomycin Status of Patients Having Complications		
		B.P. Fissulas	Late Reactions	Wound Inf.	Early Spreads	Cavernostomy Closure Failures	Total Patients with Complications	Sen.	Res.	Assumed Res.	
Streptomycin Group	8	2	1		1	1	2		1	1	
Resection Cavernostomy	2					1	2		2		
Control Group	8			1			1	1			
Resection Cavernostomy	5						0				

## LATE EXTENSION OR PROGRESSION OF THE DISEASE

Reference to table IV demonstrates that, in the streptomycin group, 4 patients (8.16 per cent) had late progression of their pulmonary tuberculosis. Of these, 3 are dead and 1 is living. Of these 4 patients, 2 were known to be resistant to streptomycin at the time of their reaction. In the other 2 patients no streptomycin resistance studies were available but in each instance the patient had received long periods of streptomycin therapy during the time when 2 Gm. per day were being administered and their streptomycin resistance might safely be assumed. In 2 of these patients, late extensions followed supplementary surgery. One had a pulmonary resection and developed a bronchopleural fistula with extension of the tuberculous process. His streptomycin resistance could only be assumed. In the other case, the reactivation occurred after an unsuccessful cavernostomy. This patient was known to be resistant to streptomycin. The other 2 patients developed a late progression subsequent to the operation of thoracoplasty. One of these patients was known to be resistant to streptomycin and the other was assumed to be resistant to the drug.

Of the 50 patients in the control group, only 2 had progression of their disease. In each instance the patient succumbed as a result of this progression. In each instance the reactivation occurred after thoracoplasty and not after supplemental operations.

## COMPLICATIONS AFTER SUPPLEMENTAL OPERATIONS

An analysis of complications following secondary operations was made in both the streptomycin treated group and in the control group (table V). The complications predominated in the streptomycin group despite the fact that only 10 such operations were performed in this group in comparison to 13 in the control group.

In 2 patients of the treated group, pulmonary resection was performed with the subsequent development of bronchopleural fistula. In 1 of these cases a massive tuberculous spread occurred in the contralateral lung and caused the patient's death. In this case streptomycin resistance studies had not been performed but the patient had received three prolonged courses of streptomycin previously, one of which was given at the time when 2 Gm. per day were being administered. The other patient developing a bronchopleural fistula was known to be streptomycin resistant. Complications occurred in 2 other patients of this group, both of which had an Eloesser cavernostomy performed. In 1 of these cases a reactivation occurred in the contralateral lung shortly after performance of the cavernostomy. He was known to be streptomycin resistant. In the other

case the patient closed his cavity and converted his sputum but three attempts at closure of the cavernostomy were made, the wound finally healing by third intention approximately two months after the last attempt at closure. This patient was also known to be streptomycin resistant.

In the control group 1 patient developed a mild wound infection following pulmonary resection. This wound infection had completely healed one month after his operation. This represented the only complication in the control group. There were no bronchopleural fistulas and all cavernostomy closures were accomplished with first intention healing.

#### EARLY AND LATE DEATHS

Table VI compares the number of deaths reported in 1948 with those occurring in the subsequent 18 months.

TABLE VI  
*Comparison of Deaths*  
(August, 1948, and February, 1950)

	Patients	Deaths (Aug. 1948)		Deaths (Feb. 1950)	
		No.	Per Cent	No.	Per Cent
Streptomycin Group	49	2	4.1	5	10.2
Control Group	50	0	0	4	8.0

In 1948 there were two deaths, both occurring in the streptomycin group. One of these patients died from a nonspecific brain abscess and the other had an extension of his pulmonary tuberculosis shortly after the thoracoplasty was completed.

Since 1948 three additional deaths occurred in the streptomycin treated group. One followed a secondary operation of pulmonary resection and was caused by the development of a bronchopleural fistula with massive spread to the contralateral lung. No resistance studies were available on this patient and it was only assumed that he was resistant from the large amounts of streptomycin that he had received prior to that time. The other 2 patients died as a result of progression of the pulmonary tuberculosis. In each of these cases the patients were known resistant to streptomycin.

In the control group there were four deaths, all of which occurred subsequent to the report of 1948. One of these occurred as an operative death during a secondary operation of pulmonary resection. He developed uncontrollable oozing at the termination of the operative procedure and died of exsanguination. In another case,

the patient developed severe serum jaundice a few weeks after the thoracoplasty and died from this complication. The remaining 2 patients died from an extension of the pulmonary tuberculosis.

#### CONCLUSIONS

1. Results of a two year follow-up on 49 patients who received streptomycin as a prophylactic measure with the operation of thoracoplasty, substantiates the fact that streptomycin is not desirable in the routine thoracoplasty operation.

2. The study suggests that native resistance is superior to temporary streptomycin protection in a long follow-up period.

3. The percentage of complications in supplemental operations is greater in those patients who received streptomycin with their initial operation of thoracoplasty.

4. A parallelism is suggested between the development of streptomycin resistance and the development of surgical complications in all forms of surgery of tuberculosis. The evidence contained in this paper is not conclusive since the series is small and the presence of resistant strains of bacilli could only be assumed on two or three occasions.

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## COMBINED RETROGRADE AND FUNDAL DISSECTION OF THE GALLBLADDER IN CHOLECYSTECTOMY

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Evansville, Ind.

**E**VEN though the first successful cholecystectomy was carried out in this country on Sept. 24, 1886,<sup>1</sup> there still remains a difference of opinion amongst surgeons as to whether it should be removed from the cystic duct upward,<sup>2</sup> or from the fundus down toward the cystic duct.<sup>3</sup> A brief review of the literature seems to indicate about an evenly divided opinion as to the method of choice; apparently some surgeons always preferring the retrograde method, while others prefer to carry out the dissection from the fundus downward. A third school indicates a preference for removal from the cystic duct upward, except in the presence of a fibrous, thickened, "difficult" gallbladder, in which case the removal is carried out from the fundus toward the cystic duct.<sup>4</sup> No reference is made to the use of a combination of these approaches, although this maneuver has undoubtedly been employed by many surgeons. It is our purpose in this short report to call attention to this technic, and to emphasize those situations in which this maneuver greatly aids in the removal of the gallbladder. We have chosen to call it a combined retrograde and fundal dissection technic for cholecystectomy.

The accompanying drawing serves to illustrate the essential features involved. The dissection is begun on the inferior margin of the neck of the cystic duct by opening the peritoneum in this area and dividing it down to the choledochus. The cystic duct is isolated by blunt dissection; the procedure being carried out high on the duct and in close proximity to it. Calot's triangle is demonstrated, and the cystic duct divided between clamps and ligated. The gallbladder end of the cystic duct is led somewhat inferiorly and towards the patient's left side. This aids in the identification of the cystic artery, which is then divided and ligated. The dissection is then carried upward for about 1 cm., at which point a second small vessel is usually encountered which we term the accessory cystic artery. This vessel is ligated. At this level the gallbladder usually dips sharply upward into the gallbladder notch of the right lobe of the liver, and this anatomical factor, plus the overhanging liver substance makes the exposure often inadequate. At this stage of the operation all clamps, except the one on the severed cystic duct, are removed from the gallbladder, an additional pack is placed near

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From the Surgical Service of The Welborn Clinic and The Welborn Memorial Baptist Hospital, Evansville, Ind.

the foramen of Winslow, the gallbladder is more or less replaced in its normal position, and this portion of the dissection is temporarily abandoned. The attention is now directed toward the fundus of the gallbladder, peritoneal flaps are developed to suit the surgeon's choice, and the cholecystectomy completed from above downward, individually ligating the necessary structures under direct vision.

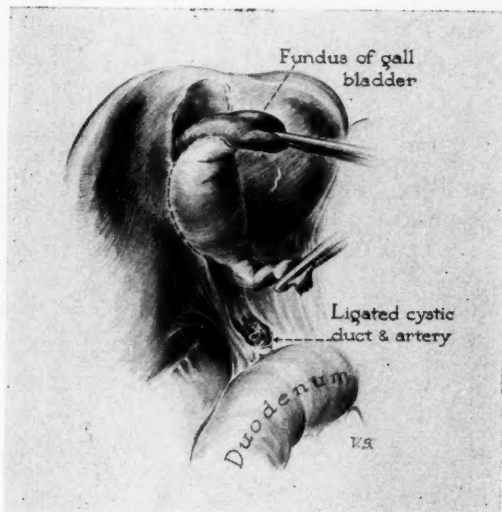


Fig. 1. Artist's conception of combined retrograde and fundal dissection of the gallbladder in cholecystectomy. The first step in the operation consists of division and ligation of the cystic duct and artery. The second step is accomplished by dissecting the gallbladder from the fundus downward.

Only the essential features of this technic have been mentioned; it is necessary, of course, to vary it slightly in individual patients, and in those instances of anomalies of the arterial and duct systems. This method of cholecystectomy combines the advantages of permitting the surgeon to carry out the most difficult part of the operation about the cystic duct first, without having blood come down from above to obscure the field, and at the same time permits him later to dissect the fundal and remaining portions of the gallbladder under direct vision, with individual ligation of important structures as they are encountered.

This maneuver will aid in carrying out the dissection under direct vision in all cases except in that small group in which the right lobe of the liver lies high underneath the right costal margin. In those cases in which there are marked, acute inflammatory changes about

the region of the junction of the cystic and common duct distorting the usual anatomical landmarks, simple drainage of the gallbladder as the first stage in a two stage procedure is carried out. Experience teaches each surgeon when he must for safety's sake perform this simple procedure; he will have learned prior to this time that it must be elected before, and not after he has gotten into serious trouble.

We have in recent months used this technic in a consecutive series of 219 operations directed at the gallbladder. Cholecystectomy was carried out in 193, or in 88 per cent of these operations. There were three hospital deaths in the 193 cholecystectomized patients for a mortality rate of 1.5 per cent. All of the deaths were due to cardiovascular disease in elderly patients. There were no operative injuries to the common bile duct.

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3. Simon, M. M.: Pitfalls to be avoided in cholecystectomy, *Am. J. Surg.* 66:367 (Dec.) 1944.
4. Cole, W. H.: *Operative Technic in General Surgery*, New York, Appleton-Century-Crofts Co., 1949, chap. 12, p. 497.

# THE AMERICAN SURGEON

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Volume XVII

September, 1951

Number 9

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## EXSANGUINATING PEPTIC ULCER

Massive hemorrhage from a peptic ulcer is one of the most common causes of exsanguination, and as such has been the cause of too many untimely deaths while the patient has been hovered over by the internist and the surgeon. Without fail the attendants bring up the time-honored argument of whether or not to transfuse, using the theory that the bleeding will stop when the blood pressure gets low enough. If, however, the decision is to transfuse, more often than not the bleeding does continue or begin anew. Finally in desperation the surgeon opens the abdomen with the patient in severe shock, trying to locate and ligate the offending bleeder. Under such circumstances the surgery cannot be complete for usually time is of the essence—"Get in quick; get out quicker." This is regretted by all concerned even if successful, which too often it is not.

In individuals allowed to bleed down until blood pressure is so low that the bleeding stops and the vessel thromboses, the way back to health is slow and treacherous. We have in mind a patient whom we saw, but did not treat, who successfully navigated this

stormy course and who had personality changes that have now been present some years. This was, without doubt, due to cerebral changes brought on by the anoxia caused by the extremely low blood pressure and the severe anemia which was allowed to persist for several days.

The solution of this problem has been, until the present, quite hard on all concerned.

The intra-arterial transfusion seems to be the perfect answer to this question of the severely hemorrhaging peptic ulcer. The procedure now is one of action—not helter-skelter action, but definitive treatment. The patient admitted in severe shock due to hemorrhaging peptic ulcer is now cross matched for transfusion and prepared for immediate laparotomy. As soon as the cross matching of several pints of blood is complete and the patient has been prepared, the operating room is set up and the procedure is begun. At first a cannula is inserted into an accessible artery, usually the radial, and the intra-arterial transfusion is begun. Within 5 to 10 minutes the blood pressure and pulse are within normal range and the abdomen can be opened. The bleeding point is found and dealt with properly; then, instead of backing out as formerly, a gastric resection can be performed with an expected mortality only slightly higher than that of the elective group.

The optional method here is to get the intra-arterial transfusion ready to go, with the cannula in the artery, waiting until the bleeding vessel is ligated before bringing the pressure to normal. This does prevent the loss of blood, but allows the patient to remain in the dangerous state of shock a little longer. This decision must be individualized according to the severity of shock and the availability of blood.

Intra-arterial transfusions are by no means new since there have been occasional reports concerning them in the literature for the last 12 years. However, for some reason, the procedure has never become commonly used in those conditions in which it is definitely indicated. Experimentally, Robertson et al showed that intra-arterial transfusions returned the blood pressure in dogs from a level of shock to within normal limits in roughly one-fourth the time of rapidly administered intravenous transfusions. In the intra-arterial administration of blood the coronary pressure is rapidly brought to normal followed almost simultaneously by the pressure in the cerebral vessels. Thus the heart and brain are supplied with blood early, while in rapidly administered intravenous transfusions the load is first on the right heart, then the left heart before the coronary circulation is improved at all. It is for this latter reason

that fast intravenous administration of blood to the patient in severe shock is occasionally followed by cardiac failure.

All hemorrhaging peptic ulcers obviously can not fall in the category which are treated in this manner. We have felt that this method should be used only in the really severely hemorrhaging patient, and especially in those over 50 years of age. Certainly we agree that conservatism is the method of choice until one finds a truly desperate condition exists or is impending. The action we have here described is needed in these instances because the patient is brought out of shock within a matter of minutes; the mortality of operating on a patient in shock is obviated; one operation suffices to stop the bleeding point as well as to treat the causative factors involved. This saves the patient time in the hospital, reduces the cost to the patient, prevents heart damaging worries to the physician, and, most important of all, *saves lives*. This seems to be a rational approach to the severely bleeding peptic ulcer.

A. H. LETTON, M.D.

Atlanta, Ga.



## BOOK REVIEWS

*The Editors of THE AMERICAN SURGEON will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The editors do not, however, agree to review all books that have been submitted without solicitation.*

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**THE LIFE OF PETER FAYSSOUX.** By CHALMERS G. DAWSON. Columbia, Medical Association of South Carolina, 1950. 151 pages. Cloth, \$2.75.

This is a short biographical sketch presented by the Medical Association of South Carolina telling part of the life history of its first president. The book traces the family history through its arriving in the new world and then devotes itself in regular order to the education of Peter both in the colony and in Edinburgh. It traces his career in the service of his country during the Revolution.

His political escapades and his success as a rice planter are overshadowed only by his practice of medicine which showed his understanding sympathy for his patients as well as for those less fortunate than himself.

The founding of the Medical Association of South Carolina and Dr. Fayssoux's election as its first president is described. He may, without exaggeration, be called the Father of Medicine in the State of South Carolina.

This volume, in addition to being a personal history of a man, is also a short history of that period of the state of South Carolina, which is to be expected because of the prominent part Dr. Fayssoux played in the molding and making of that State.

A. H. LETTON, M.D.

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*Books received are acknowledged in this section, and such acknowledgment must be regarded as a sufficient return for the courtesy of the sender. Selections will be made for review in the interests of our readers and as space permits.*

**ANATOMY IN SURGERY.** By PHILIP THOREK, M.D., F.A.C.S., F.I.C.S., Assistant Professor of Surgery, University of Illinois College of Medicine; Diplomate of the American Board of Surgery; Associate Professor of Tipographic Anatomy and Clinical Surgery, Cook County Graduate School of Medicine; Member of the American Association of Anatomists; Fellow, American College of Chest Physicians; Co-Surgeon in Chief of the American Hospital; Associate Attending Surgeon of the Cook County Hospital; Senior Attending Surgeon of the Alexian Brothers' Hospital, Philadelphia, J. B. Lippincott Company, 1951. \$22.50.

**ENDOSCOPY, AS RELATED TO DISEASES OF THE BRONCHUS, ESOPHAGUS, STOMACH, AND PERITONEAL CAVITY.** By EDWARD B. BENEDICT, A.B., M.D., F.A.C.S., Assistant Clinical Professor of Surgery, Harvard Medical School Endoscopist, Massachusetts General Hospital, Boston, Mass. Baltimore, The Williams & Wilkins Company, 1951. \$10.00.

**PRINCIPLES AND PRACTICE OF OBSTETRICS.** By J. P. GREENHILL, M.D., Attending Obstetrician and Gynecologist, The Michael Reese Hospital;

Obstetrician and Gynecologist, Associate Staff, The Chicago Lying-In Hospital; Attending Gynecologist, Cook County Hospital; Professor of Gynecology, Cook County Graduate School of Medicine. New, 10th Ed. Philadelphia and London, W. B. Saunders Company, 1951. \$12.00.

A HISTORY OF NEUROLOGICAL SURGERY, edited by A. EARL WALKER, Professor of Neurological Surgery of Johns Hopkins University. Baltimore, The Williams & Wilkins Company, 1951. \$12.00.

POST GRADUATE LECTURES IN ORTHOPEDIC DIAGNOSIS AND INDICATIONS, Vol. 2. By ARTHUR STEINDLER, M.D., F.A.C.S., Professor of Orthopedic Surgery, State University of Iowa, Iowa City, Iowa, Springfield, Ill. Charles C Thomas. \$6.00.

THE AMERICAN ILLUSTRATED MEDICAL DICTIONARY, 22nd Ed. By W. A. N. DORLAND, M.D., F.A.C.S., Lt. Colonel, M.R.C., U. S. Army, former member of the committee on Nomenclature and Classification of Diseases of the American Medical Association. Philadelphia, W. B. Saunders Company, 1951. \$10.00.

## ABSTRACTS FROM CURRENT LITERATURE

THE EFFECT OF VASODILATOR DRUGS ON THE CIRCULATION OF THE EXTREMITIES. Daniel C. Elkin and F. W. Cooper, Jr., *Surgery* 29:323-333 (Mar.) 1951.

The primary function of the circulation of the skin and superficial tissues is nutrition of the tissues and regulation of body temperature; whereas the circulation to the muscles of an extremity supplies an organ of motion. Moreover, the indications for relieving pathologic vasospasm or for relaxing normal vasomotor tone in certain pathologic conditions varies with the nature of the disease state being treated. Recognition of these basic principles prompts investigation of the desirability of generalized vasodilation as contrasted with selective denervation of an extremity in the various types of peripheral vascular disease.

In this study, the effects of selective denervation as well as the effects of the commonly employed vasodilator drugs were studied. Their effect upon the rate of removal of radioactive sodium from the muscle was measured as well as changes in skin temperature, toe volume and pulse volume. Illustrative case reports are included.

Augmentation of the circulation to one portion of the body at a given time must necessarily occur at the expense of that to another portion. A similar circulatory process operates among the various constituents of an extremity. Thus when increased activity produces increased demand for blood in the skeletal muscles, there may occur peripheral vasoconstriction to produce a decrease in the flow through the skin and superficial tissues.

Though selective denervation will produce an increase in blood flow to the area, generalized vasodilation will result in a more equal distribution of blood through pathways of equal resistance, but it will not increase blood flow in a given area.

"The therapeutic implications are obvious . . . in organic arterial diseases, localized vasodilation only should be employed. . . . In the treatment of primarily vasospastic conditions . . . the problem is one of a quite different nature. With the actual caliber of the peripheral vessels remaining unobstructed, there is need only to decrease the sensitivity of the peripheral vessels to vasomotor control. The administration of vasodilator compounds prior to the reception of the vasomotor stimuli has brought results of marked clinical improvement. . . . In certain vasospastic conditions it is believed that these compounds may have a valuable function, but only in such conditions should these be used."

R. H. S.

THE GLOMUS TUMOR: REPORT OF TWENTY CASES. Manuel Riveros and George T. Pack. *Annals of Surgery* 138:394-400 (Mar.) 1951.

The glomus tumor is a small, benign tumor of the skin and subcutaneous tissues, occurring usually on the extremities. Its outstanding characteristic is the painful nature of the lesion. The tumor occurs chiefly on the hands and feet, often in the nail bed.

The tumor arises from a glomus, the normal end-organ apparatus of a bizarre arteriovenous anastomotic nature which apparently regulates the rate of flow of blood through the extremities. They are distributed widely over

the body but occur more frequently on the extremities, less frequently on the penis.

Various synonyms for the glomus tumor exist: angiomyoneuroma, tumeur du glomus neuromyoartériel, glomangioma and others. In some glomus tumors, the blood vessels are so large they resemble true angiomas. The tumors vary in the reported series from 5 mm. to 2 cm. (Ed. note—In the same number of the *Annals*, Riddell and Martin report a glomus tumor measuring 3 by 2.5 by 1.5 cm.)

The pain of the glomus tumor may be associated with various sympathetic disturbances such as Horner's syndrome. The pain and sensitivity of the tumor are such that the patient will frequently take great care to protect it. It is usually exaggerated in cold weather and sometimes is relieved by immersion in warm water.

The tumors are not always visible or palpable. In such instances, underlying bone destruction of the phalanx may be noted. In many instances the pain long precedes recognition of the presence of a tumor. Sometimes the patient does not associate the pain with the pinpoint lesion.

The tumor is usually discolored, either blue, purple, or red. The color may vary at times and patients occasionally notice a deepening of the color during a paroxysm of pain.

The lesion is cured by surgical excision. It does not respond to radiation. Sympathectomy is of no benefit. It is invariably benign and does not recur after removal. The reported instances of metastasis are open to question.

R. H. S.

APPRAISAL OF VAGOTOMY FOR PEPTIC ULCER AFTER SEVEN YEARS. Lester R. Dragstedt and Edward R. Woodward. *Journal of the American Medical Association* 145:795-800 (Mar. 17) 1951.

"If it be granted that the theoretical considerations prompting the use of vagotomy in the surgical treatment of duodenal ulcer are sound, there remains the question, 'Is this method safe, efficient and practical, and does it compare favorably with subtotal gastrectomy in the treatment of the disease?'"

The authors emphasize that any comparison between vagotomy and subtotal gastrectomy should take into consideration the fact that vagotomy is the more recently employed of the two procedures and it must be realized that gastrectomy as it is now done gives much better results and less morbidity and mortality than when first performed.

Vagotomy operations for peptic ulcer were performed on 509 patients during the period from 1943 to 1950. Four hundred and eight (80 per cent) of these patients are entirely well and back at work. Fifty-four (11 per cent) are apparently free of active ulcer disease but have some gastrointestinal symptoms so that the results cannot be considered entirely satisfactory. Forty-seven (9 per cent) are considered failures.

Four hundred and fifty-three of the operations were performed on patients with duodenal ulcer. The percentage of good, fair and unsatisfactory results were about the same as for the entire group. Twenty-six of the operations were done for gastric ulcers. Sixty-two per cent secured good results, 15 per cent fair results, and 23 per cent poor results. Thirty operations were performed for gastrojejunal ulcer. Eighty-one per cent of these secured a good result.

There were six deaths in the entire series of 509 operations giving a mortality rate of 1.18 per cent. There have been no deaths in the last 180 operations which indicates that with more experience in selection and postoperative treatment of patients, a very low mortality rate is possible.

Dragstedt and Wodward feel that a few writers have magnified the post-operative symptoms attributable to the interruption of the vagus nerves. In comparison to the complications attending subtotal gastrectomy when it was first introduced, the complications of vagotomy seem trivial. The authors' conclusions are quoted:

"1. Complete vagotomy by a transabdominal, transdiaphragmatic approach, combined with a gastroenterostomy of small size, is a relatively safe, efficient and practical method of surgical treatment and should replace subtotal gastrectomy as the initial, definitive, surgical treatment for duodenal, gastrojejunal and certain esophageal ulcers.

"2. The complications of vagotomy operations for peptic ulcer are chiefly due to motor disturbances in the stomach, are for the most part trivial and self-limited and can be controlled or eliminated entirely by gastroenterostomy and adequate postoperative decompression of the stomach.

"3. Persistence, or recurrence, of duodenal or gastrojejunal ulcer is almost invariably due to incomplete vagotomy as evidenced by physiological tests.

"4. Deviation of the alkaline juices of the duodenum away from the region of the anastomosis by entero-enterostomy in association with gastroenterostomy for duodenal ulcer is a mistake and can be expected to lead to the development of a stoma ulcer in spite of a complete vagotomy.

"5. The data in this study support the concept of duodenal ulcer as of psychosomatic or nervous origin."

R. H. S.

**MELANOCARCINOMA OF THE PLANTAR SURFACE OF THE FOOT: A REVIEW OF TWENTY-FIVE CASES.** Alfred M. Decker and James T. Chamness. *Surgery* 29:731-742 (May) 1951.

The 25 cases reported herein represent the accumulated cases of histologically proved melanocarcinoma primary on the sole of the foot seen at the Barnes Hospital and the State Cancer Hospital in St. Louis. A detailed analysis of these cases is presented.

Nine patients had a pre-existing mole. Eight had noted a change in color of their lesion from brown to black. There were six histories of plantar trauma. Three lesions presented only as ulcers. The remaining 22 became actual tumors at some time during the course of the disease.

The gross appearance often was not suggestive of melanoma. Eight were not pigmented grossly and 6 contained no melanin granules on microscopic examination. The authors recognize that the ultimate diagnosis is a microscopic one, the resemblance to benign lesions being striking in many instances.

Some of the patients in this series had had previous treatment elsewhere. The methods of controlling the local lesion were varied. Fourteen of the 25 cases had clinically apparent metastases in the inguinal lymph nodes which were confirmed microscopically after resection of biopsy. Only 6 had "therapeutic" inguinal node resections, however, because 8 of those cases with palpable nodes had inoperable involvement when first seen. Only when metas-

tasis was generalized were metastases noted along the course of the lymphatics in the lower extremity. The authors conclude from this observation that the principle of en bloc dissection in continuity of the primary lesion and regional lymph drainage as advocated by Pack is probably not advisable. They do consider that the principle of delayed node dissection to allow for filtration of tumor emboli is well taken.

In regard to management of the local lesion, Decker and Chamness advocated excision with a 3 to 4 cm. margin including the plantar fascia if the lesion be 2 cm. or under in size. For larger lesions, they consider low leg amputation the treatment of choice. Regardless of the way the local lesion is handled, the inguinal region should be dissected whether palpable nodes are present or not.

The authors feel that all nevi of the plantar surface of the foot should be excised and they feel that scalpel excision is preferable to cautery. They do not object to biopsy under some circumstances and consider it preferable to procrastination regarding radical excision. "We do, however, feel strongly that any pigmented nevus or lesion with a tendency to grow, ulcerate, or otherwise behave unusually should be preferably excised or under some circumstances biopsied for microscopic diagnosis. Furthermore, it is felt that all nevi of the sole of the foot, pigmented or not, should be subjected to excision biopsy even if such excision means the necessity of a skin graft."

R. H. S.



**PROGRAM**  
**SOUTHWESTERN SURGICAL CONGRESS**

**Jefferson Hotel—St. Louis, Mo.**

**September 24, 25, 26, 1951**

**Monday Morning, September 24, 1951**

9:00 A.M. Dr. J. William Thompson, *presiding*  
Invocation  
Announcements

1. *"Utilization of the Aponeurosis Transversus Abdominis, Cooper's Ligament, and the Iliopubic Tract in the Repair of Inguinal and Femoral Hernias."*

John H. Clark, Salt Lake City, Utah

Edward I. Hashimoto, Salt Lake City, Utah

(By Invitation)

2. *"A New Anatomical Approach to the Repair of Incisional and Inguinal Hernia."*

Ralph H. Coffey, Kansas City, Missouri

3. *"Split-Split Flap Technique of Dermal Graft Repair of Massive Abdominal Hernias."*

J. Ordie Shaffer, Salt Lake City, Utah

4. *"The Repair of Massive Calvarial Defects."*

Gilbert O. Dean, Little Rock, Arkansas

Robert Watson, Little Rock, Arkansas

5. *"Pancreatitis: Current Concepts."*

J. G. Probststein, St. Louis, Missouri

6. *"Surgical Management of Pancreatic Lesions."*

William P. Longmire, Los Angeles, Calif.

**Monday Afternoon—September 24, 1951**

2:00 P.M. Dr. Lewis M. Overton, *presiding*  
Councilor from New Mexico

7. *"Problems of Protein Alimentation."*

E. R. Crews, San Antonio, Texas

8. *"Acute Loss of Plasma Proteins in Surgical Conditions."*

Philip B. Price, Salt Lake City, Utah

9. *"Practical Potassium Therapy in Surgical Patients."*

Robert M. Zollinger, Columbus, Ohio

Edwin H. Ellison, Columbus, Ohio

Thomas W. Morgan, Columbus, Ohio

Thomas Boles, Columbus, Ohio

10. *"The Embryology of the Mid Gut and Its Relationship to Mid Gut Anomalies."*

Woodrow Nelson, Salt Lake City, Utah

11. *"Lesions of the Large Bowel in Children."*  
Richard A. Twyman, Kansas City, Missouri
12. *"Atresia, Stenosis, and Duplication of the Intestinal Tract in Infants."*  
H. Calvin Fisher, Denver, Colorado
13. *"Inflammatory and Neoplastic Lesions of the Small Intestine."*  
Kenneth C. Sawyer, Denver, Colorado
14. *"Colostomy Stoma Tumors."*  
Edward L. Miloslavich, St. Louis, Mo.
15. *"Tissue Specificity of Experimentally Induced Metastases in Rats."*  
Everett D. Subarbaker, Jefferson City, Mo.

#### Tuesday Morning—September 25, 1951

- 9:00 A.M. Dr. Kenneth C. Sawyer, *presiding*  
*Vice-President*
16. *"The Billroth I Type of Gastric Resection."*  
Kenneth B. Castleton, Salt Lake City, Utah
  17. *"Modified Technic for Total Gastrectomy with Formation of a Food Pouch from Jejunum."*  
Claude J. Hunt, Kansas City, Missouri  
Joseph S. Cope, Kansas City, Missouri
  18. *"Standardization of Gastric Resection in the Treatment of Peptic Ulcer."*  
Robert Woodruff, Denver, Colorado
  19. *"The Surgical Treatment of Peptic Ulcer."*  
George Crile, Jr., Cleveland, Ohio
  20. *"Ligation of Superior Mesenteric Vein."*  
William N. Harsha, Kansas City, Kansas  
Thomas G. Orr, Kansas City, Kansas
  21. *"Nerve Block for the Control of Pain."*  
F. A. Duncan Alexander, McKinney, Texas
  22. *"The Surgical Treatment of Intractable Pain."*  
James C. Walker, Temple, Texas

#### Tuesday Afternoon—September 25, 1951

- 2:00 P.M. Dr. L. W. Storey, *presiding*  
*Councilor from Wyoming*
23. *"Conservative Treatment of Backache."*  
Earl D. McBride, Oklahoma City, Oklahoma
  24. *"Sympathectomy in the Management of Arteriosclerosis Obliterans."*  
Cyril Costello, St. Louis, Missouri
  25. *"Modern Concepts of Intestinal Antisepsis."*  
Edgar J. Poth, Galveston, Texas
  26. *"Necrotizing Fasciitis."*  
Ben J. Wilson, Dallas, Texas

27. *"The Prevention and Control of Clostridial Infections in Wounds."*

W. A. Altemeier, Cincinnati, Ohio

28. PRESIDENTIAL ADDRESS: *"The Training of a Surgeon."*  
Leo J. Starry, Oklahoma City, Oklahoma

**Wednesday Morning—September 26, 1951**

9:00 A.M. Dr. L. J. Starry, *presiding*  
*President*

29. *"Chalangiography."*

Don C. Weir, St. Louis, Missouri

30. *"Plastic Reconstruction of the Trachea and Bronchi."*

Donald L. Paulson, Dallas, Texas

31. *"Pulmonary Adenomatosis and Its Relationship to the Problem of Malignant Tumors of the Lung."*

J. Gordon Strance, Albuquerque, New Mexico

32. *"The Use of Streptokinase and Streptodornase in the Management of Injuries of the Chest."*

Colonel James Forsee, Denver, Colorado

Major Hu A. Blake, Denver, Colorado

(By Invitation)

Major William H. Moncrief, Denver, Colorado

(By Invitation)

33. *"Urinary Bladder Substitution with Isolated Small Intestinal Segments: A Progress Report."*

Eugene M. Bricker, St. Louis, Missouri

34. *"Treatment of Intra-Oral Tumors."*

James W. Hendrick, San Antonio, Texas

35. *"Surgical Lesions of the Adrenal with Particular Reference to Cushing's Syndrome."*

James T. Priestly, Rochester, Minnesota

**Wednesday Afternoon—September 26, 1951**

2:00 P.M. Dr. Martin C. Lindem, Councilor from Utah, *presiding*

36. *"Hyperparathyroidism."*

William F. Rienhoff, Jr., Baltimore, Maryland

37. *"Management of Thyroid Carcinoma."*

George O. Miles, Kansas City, Missouri

38. *"Papillary Thyroid Cancer Originating in the Thyroglossal Cyst."*

Billie L. Aronoff, Dallas, Texas

39. *"Removal of Benign Mixed Tumors of Anlage Origin in the Parotid Region with Preservation of the Seventh Nerve."*

James Barrett Brown, St. Louis, Missouri

Frank McDowell, St. Louis, Missouri

(Co.Author)

Minot P. Fryer, St. Louis, Missouri

(Co.Author)

*Official Program*

**NORTHEASTERN SECTION  
SOUTHEASTERN SURGICAL CONGRESS**

**Lord Baltimore Hotel  
Baltimore, Maryland**

**THURSDAY, SEPTEMBER 13, 1951 — Registration — 8 A. M.**

- 8:30 A.M. Operative Clinics, Johns Hopkins Hospital  
11:00 A.M. Surgical Clinics, Hurd Hall, Johns Hopkins Hospital, conducted by Dr. Alfred E. Blalock  
2:00 P.M. Address of Welcome—Dr. W. Raymond McKenzie, Chairman, Maryland Section

*Dr. Harry Lee Claud, presiding*

1. "Amoebiasis as a Complication in Abdominal and Thoracic Surgery," by Dr. Oscar B. Hunter, Washington, D. C.
2. "Intramedullary Fixation of Double Fractures of the Femur," with slides, by Dr. Edmond J. McDonnell, Baltimore, Md.
3. "Treatment of Intussusception by Barium Enema," with slides, by Dr. Mark M. Ravitch, Baltimore, Maryland.
4. "Transverse Presentation—an analysis of Recent Cases," by Drs. Louis C. Gareis and J. Morris Reese, Baltimore, Md.
5. "The Operation for Difficult Sliding Hernias," with slides, by Dr. Amos R. Koontz, Baltimore, Md.
6. "The Effect of Prostatectomy on Hypertension," by Dr. Austin I. Dodson, Richmond, Va.; Dr. Alan J. Chenery, Washington, D. C.; Dr. James W. Choate Washington, D. C.

Open Discussion from the Floor

Cocktails—7 P.M.—Thursday, September 13, 1951

Banquet—8 P.M.—Thursday, September 13, 1951

*Toastmaster—Dr. W. Raymond McKenzie, Baltimore, Md.*

Entertainment

**FRIDAY, SEPTEMBER 14, 1951**

8:30 A.M. to 12:30 P.M. "Operative Clinics and Dry Clinics, University Hospital, conducted by the Surgical Staff."

*Dr. Everett L. Gage, presiding*

2:00 P.M.

1. "Duodenal Diverticula," by Dr. John C. Condry, Charleston, W. Va.
2. "The Treatment of Acute Traumatic Injuries of the Hand," with slides, by Dr. Raymond M. Curtis, Baltimore, Md.
3. "The Pathology of Colonic Diverticulosis," by Dr. S. D. Wu, The Myers Clinic, Philippi, W. Va.
4. "Precursory and Early Stages of Uterine Cancer," with slides, by Dr. Emil Novak, Baltimore, Md.
5. "The Control of Blood Pressure in the Anesthetized Patient," by Dr. Otto C. Phillips, Baltimore, Md.

Open Discussion from the Floor

**SATURDAY, SEPTEMBER 15, 1951**

Dr. Waverly R. Payne, *presiding*

9:00 A.M.

1. "Intestinal Obstruction," by Dr. Charles H. Lupton, Norfolk, Virginia.
2. "Dermatologic Diagnosis and Its Relationship to Surgery," with slides, by Dr. H. M. Robinson, Jr., Baltimore, Md.
3. "Subtotal Gastrectomy for Peptic Ulcer," with slides, by Dr. James W. Tankard, Hilton Village, Va.
4. "Hyperparathyroidism," by Dr. William F. Rienhoff, Jr., Baltimore, Md.
5. "Megalocolon:—Diagnosis and Treatment," with slides, by Dr. R. M. Cunningham, Baltimore, Md.
6. "Endometriosis," by Dr. J. Donald Woodruff, Baltimore, Md.

Open Discussion from the Floor

**SPECIAL ANNOUNCEMENTS**

On Friday afternoon, September 14, 1951, business meetings for each state section will be held following the scientific program. A meeting of the entire Northeast Section of the Congress will also be held prior to this.

There will be no golf tournament, but those interested in playing golf should contact Dr. W. R. McKenzie for golf on Saturday afternoon.

On Friday, September 14, 1951, there will be a program devoted to the ladies to include a sightseeing tour to historic, Colonial Annapolis. Here can be seen the State Capitol, Governor's Mansion, Naval Academy and the preserved beauty of early America. Luncheon will be served at the famous Carvel Hall.

**CONVENTION ARRANGEMENT COMMITTEE**

Dr. W. Raymond McKenzie, Baltimore, Maryland, chairman  
 Dr. Waverly R. Payne, Newport News, Virginia  
 Dr. Harry Lee Claud, Washington, D. C.  
 Dr. Everett Lyle Gage, Bluefield, W. Va.  
 Mr. R. J. Wilkinson, Jr., Huntington, W. Va., secretary

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Articles will be accepted for publication on condition that they are contributed solely to The American Surgeon. Manuscripts must be typewritten, double-spaced, and the original copy should be submitted. They are all subject to editing. The cost of as many as five illustrations will be borne by the publishers. The cost of all over five will be borne by the author.

References should conform to the style of the Quarterly Cumulative Index Medicus, published by the American Medical Association. This requires, in order given: name of author, title of article, name of periodical, with volume, page, month (day of month if weekly) and year.

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